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AMATEUR RADIO

THE WIA RADIO AMATEURS JOURNAL

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Control unit for the fabulous IC900A VHF/UHF multi-band transceiver, which is the grand prize for the WIA 80 Competition. See details on page 36.

Ship of the Desert

EDITORIAL

BILL RICE VK3ABP EXECUTIVE EDITOR

This is mainly intended to be a first-hand account of how your Executive Editor's salt-lake safari has proceeded so far. A gentleman named Murphy has been much in evidence, and virtually everything that could go wrong, has! No, that's a little too strong. We have had no car or trailer problems of note, in over 2000 km of boat trailing, so it could be worse.

We put the boat into Lake Eyre South on Sunday 1st October. We pulled it out again on Tuesday 3rd October! In the meantime, the wind had seldom dropped as low as 30 knots. On Tuesday morning, half aground on the beach, the boat was rocking so much I could scarcely write, and the spray was going over the cabin. Since several members of our party were committed to being back in Melbourne by Monday 9th, we reluctantly wrote Lake Eyre South out of the program (even though there was up to four metres of water depth) and headed east to Marree; up the Birdsville track to see the waters of Cooper's Creek (still advancing, but so slowly!) and back, down to Port Augusta, where this is being written; and, we hope, shortly to Lake Torrens.

The main lessons which have been reinforced many times on the trip have been that, on the rough roads north of Lyndhurst (north of Leigh Creek), all but elastic-stop nuts will unscrew, all brackets etc carrying any load, will break, and mechanical bits which have survived years "down south" will disintegrate without notice. On the plus side, the combination of a solar panel and a wind-driven generator has worked perfectly. One of the highlights of the trip was when, on 2nd Oct, someone of whom we have all heard, none other than Dick Smith VK2DIK landed his Bell Jet Ranger only about fifty metres from our tent, and spent about an hour at Lake Eyre South talking to us, inspecting the boat, and having a bite of lunch! No prior arrangements; he was just looking at the flooded lakes while we happened to be there!

From here on, the objective is to sail for a day or two on Lake Torrens which, as mentioned some months back, has more water in it than at any time in the last hundred years, and perhaps also Lake Frome, before reluctantly leaving the Far North of SA. At least, even if windy, it's mild to hot, and barely a drop of rain for weeks, whereas further south they tell us it's pouring rain and cold. Wouldn't it be nice to stay here indefinitely? Unfortunately, your magazine calls. This issue must be proof-read on 19th Oct, so I can't get away from deadlines! 73 to all.

Port Augusta 5th Oct 89
ar

Wireless Institute of Australia

The world's first and oldest National Radio Society - Founded 1910
Representing Australian Radio Amateurs - Member of the International Amateur Radio Union
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Repeater Cross Linking

When 2 metre band privileges were granted to Novice operators, both the WIA and the DoTC foresaw difficulties with those, at the time, very few cross linked repeaters.

Paragraph 45 in DOC 71 reads "The repeater "link" shall not be used to permit an Amateur station transmission to be retransmitted in a band it is not authorised to employ, except where the retransmitted signal is above 30 MHz".

The wording of this paragraph has been seen to be somewhat ambiguous, and has been interpreted differently by a number of amateurs, and even some DoTC personnel.

WIA NEWS

BILL ROPER VK3ARZ GENERAL MANAGER & SECRETARY

The regulatory viewpoint, arising from the July 1989 WIA/ DoTC Joint Meeting, is that the DOC 71 conditions apply to the link channels between repeaters, and not to the repeater emissions.

In other words, 432 MHz (or higher) links may be used but the ultimate Novice radiations from the linked repeater must fall within the Novice authorised allocation of 146 to 148 MHz.

Naturally, this poses a limitation on linking 2 metre repeaters to, for example, 70 or 23 cm repeaters. I am sure those involved already appreciate the limitations with links to 6 and 10 metre repeaters!

The DoTC appreciate that this limitation disadvantages other than Novice class licence holders, but they also strongly adhere to their ruling that amateurs should not receive privileges for which they are not authorised.

The WIA must agree with that principal because it merely restates our existing policies concerning licence grade privileges.

Although this problem has been apparent for some months now, the DoTC and the WIA have been conducting in-depth discussions in an effort to arrive at the most equitable solution for all concerned. The WIA has been consulting with involved members right around Australia, but this takes time. DoTC's willingness to negotiate and be patient (rather than insist on a bureaucratic interpretation of the regulation), so that we can all arrive at the best solution to this problem, will be appreciated by all 2 metre repeater users.

In a letter dated 10th October 1989, DoTC advised the WIA of their determination in this matter. After outlining the problems, the letter goes on to say:

"The Department has considered the options available to overcome the problem outlined and believes that the most equitable solution is to adopt links activated by a tone access system rather than permanent interconnections. This arrange-

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts
VK1	ACT Division GPO Box 600 Canberra ACT 2601	President Secretary Treasurer	Ted Pearce Jan Burrell Ken Ray	VK1AOP VK1BR VK1KEN	3.570 MHz 2m ch 6950 70cm ch 6525 2000 hrs Sun
VK2	NSW Division 109 Wigram St Parramatta NSW 2124 (PO Box 1066 Parramatta) Phone (02) 689 2417	President Secretary Treasurer	Roger Henley Peter Balnaves David Horsfall	VK2ZIG VK2CZX VK2KFU	(R Denotes repeater) Times 1100 and 1915 on Sunday 1.845 MHz AM, 3.595 AM/SSB , 7.146 AM (1100 only) 28.320 SSB, 52 120 SSB 52.525 FM 147.000 FM(R) 438.525 FM(R) 584.750 (ATV Sound) Relays also conducted via many repeaters throughout NSW.
VK3	Victorian Division 38 Taylor St Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer	Jim Linton Barry Wilton Rob Hailey	VK3PC VK3XV VK3XLZ	1.840 MHz AM, 3.615 SSB, 7.085 SSB, 147.250 FM(R) Mt Macedon, 147.225 FM(R) Mt Baw Baw 146.800 FM(R) Mildura, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President Secretary Treasurer	David Jones John Aarsse Eric Fittock	VK4NLV VK4QA VK4NEF	3.605 MHz, 7.118, 14.342, 18.132, 21.175, 28.400, 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday Repeated on 3.605 & 147.150 MHz, 1930 Monday
VK5	South Australian Division Thebarton Rd West Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Don McDonald Hans van der Zalm Bill Wardrop	VK5ADD VK5KHZ VK5AWM	3.550 MHz, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.00 Adelaide, ATV 444.250 Mid North (NT)3.555, 146.500, 0900 hrs Sunday
VK6	West Australian Division PO Box 10 West Perth WA 6005 Phone (09) 474 2626	President Secretary Treasurer	Alyn Maschette Bruce Hedland - Thomas	VK6KWN VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115,14.175, 21.185, 28.345, 50.150, 438.525 MHz Country relays 3582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury)147.225(R) 147.250 (R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker Broadcast repeated on 3.560 at 1930 hrs.
VK7	Tasmanian Division PO Box 1010 Launceston TAS 7250	President Secretary Treasurer	Mike Wilson Bob Richards Peter King	VK7ZWW VK7NRR VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28 MHz).				

Note: All times are local. All frequencies MHz.

ment would allow Novice operators to use 146 to 148 MHz repeaters without the possibility of being automatically retransmitted on unauthorised bands.

Similarly, Unrestricted and Limited amateur stations would not be disadvantaged as, by the transmission of a tone signal, they could activate the link feature. The tone access facility would also have the added advantage of providing increased interference protection and allow better re-use of link frequencies.

Accordingly, as from the date of this letter, all new links used for interconnection of voice repeaters shall be required to be fitted with an audible tone burst access system. This facility shall be installed such that, to activate the link feature, the tone burst must be detected at the beginning of each transmission. Licensees of existing links will be given until 31st March 1990 to comply with the revised arrangements.

In the interim, Novice operators should ensure that they do not use repeaters operating in the 146 to 148 MHz band that are permanently linked to repeaters operating in other bands. The relevant paragraphs in the DoTC licence conditions brochure DOC71 will be amended to reflect the new conditions at the earliest opportunity."

In this letter, DoTC did not specify a frequency for the tone burst. However, they did recommend that, although selection of the tone burst frequency will be the responsibility of the repeater group concerned, the WIA may care to establish a "standard" set of frequencies to provide a co-ordinated approach.

After further discussion with the WIA Federal Technical Advisory Committee, the WIA has decided to recommend a tone burst frequency of 1750 Hz for this cross band repeater linking purpose.

This is the usual frequency of the tone burst facility already available in many 2 metre FM transceivers.

RF Tag Ident System

The DoTC is considering permitting RF identification devices to be used in Australia without being individually licensed.

The conditions that they are considering are similar to the USA Federal Communications Commission (FCC) Part 15 conditions for low power unlicensed devices.

As the proposed frequency bands include VLF, HF, VHF/UHF and microwave, and in particular 3.5 to 3.95 MHz, the DoTC approached the WIA for our views.

The WIA Federal Technical Advisory Committee examined the field strength limits proposed for the devices (15 microvolts per metre at 30 metres at HF) and compared the effective RMS noise field strength in a 1 kHz bandwidth with CCIR atmospheric noise and man made noise predictions.

The modes of modulation, hence occupied bandwidths, were not clear.

However, by making reasonable assumptions the WIA gained the impression the proposed devices would generate noise levels in excess of man made noise levels in business, residential and possibly rural areas.

Whilst it is not clear what these ID devices would be used on, possible applications could include valuable item ID tags such as VCR's, TV's, cameras and the like in stores, transport containers, pets, and persons committed to imprisonment in the home.

Thus the devices could be distributed far and wide beyond business areas, bringing with them their RF emissions.

As these RF emissions, hence noise levels, would occur in an international amateur primary band, 80 metres, the WIA has emphatically indicated its strong opposition to any approvals being granted.

Repeater Site Fees

Many of the amateur service repeaters in use in Australia have been installed on hilltop sites owned or leased by a number of authorities, such as Telecom, the DoTC, Forestry Commissions and the CAA (Civil Aviation Authority). The co-operation received from these authorities in allowing the amateur service to share their site facilities has been of great benefit to Australian amateur radio.

However, as with most, if not all, government or semi-government bodies, these authorities have been examining their operations recently with a view to becoming more financially self supporting.

Several Australian repeater groups have received advance warning of the possibility of being charged commercial rates for use of sites and masts for their repeater installations. Needless-to-say, the amateur service has many community benefit arguments (particularly the Wireless Institute Civil Emergency Net, WICEN) to put to these authorities in order to argue for the waiving of these proposed fees.

But it may be some time yet before we know the result of the amateur service representations to these authorities and learn whether we have achieved reduced fees, or even no fees at all.

In the meantime, it is interesting to note that the ARRL, and the amateur service in the USA, appear to have won a small victory in the 2 year battle with their Forestry Service about proposed site fees which were going to range from $300 to $1200 for amateur repeaters.

The US Forestry Service has just announced that they have set their annual site fee for amateur service repeaters at $75, which they say represents the cost to the Forestry Service for administration of the authorisation.

EMI Standards Draft

Over the past 12 months, the Communications Policy and Planning Division of the Department of Transport and Communications has been working on the question of Electromagnetic Interference (EMI) Standards. A stage has now been reached where a paper has been prepared which outlines the issues and a suggested approach.

This paper has been prepared following extensive discussion and consultation with industry representatives and organisations.

DoTC have now submitted the draft paper to the WIA for our comments, particularly on the recommendation that EMI standards are needed, and on possible implementation strategies.

Copies of this draft paper have been given to the Federal Technical Advisory Committee, headed by Rob Milliken, VK1KRM, to the WIA Federal EMC Co-ordinator, Hans Ruckert, VK2AOU, and to Alan Foxcroft, VK3AE, for study.

DOC 72 Now Available

The second in the trilogy of pamphlets, which are being produced by the DoTC to replace the old Amateur Operators Handbook, is now available free from all DoTC Communications Operations Division offices.

This pamphlet, DOC 72, which should be obtained by all existing and intending radio amateurs, outlines the operating procedures and practices applicable to amateur stations. The contents include calling and reply procedures, procedures for mobile and portable operation, distress and urgency communications, the Q code, classification of emission designations (do you know "off-the-top" what is a 6M25C3FMN

transmission?), the ITU phonetic alphabet, and Australian radio amateur callsign prefixes and suffixes.

The third part of this trilogy of pamphlets, entitled "Information for Prospective Amateur Operators", or DOC 70, is presently with the Australian Government Publishing Service and will be available shortly.

WIA 80 Award

Which WIA member will qualify for the WIA 80 Award certificate number 1? Eligible contacts for this award, which celebrates the 80th anniversary of the world's first and oldest national radio society, can commence as from midnight on October 31st of this year.

The rules are detailed on page 4 of September 1989 issue of Amateur Radio magazine, but basically you need to contact, and exchange membership numbers with, 80 members of the WIA, between November 1st 1989 and December 31st 1990.

If past experience is any criteria, this will be a popular contest, and the award certificates much sought after.

Update on Visiting ZL

Several weeks ago I advised you of the innovative step taken by the radio amateur licensing authority in New Zealand to enable short-term amateur visitors to that country to operate for a period of up to 4 weeks, using handheld transceivers on 144 MHz and above, without needing to obtain a reciprocal licence.

Full details of this arrangement are on page 4 of the October issue of Amateur Radio magazine.

However, further information just to hand from the New Zealand Radio Frequency Service points out that, because New Zealand Novice licensees are not permitted on the 2 metre band, Australian Novice licensees are therefore prohibited from operating under the terms of this new "walk-off" reciprocal arrangement.

Naturally, Australian Novice licensees are permitted to use the 3.5, 21 and 28 MHz bands in the usual manner while in New Zealand, provided they first obtain a standard reciprocal licence from the New Zealand RFS.

New VHF/UHF Record?

An interesting claim for a new VHF/UHF distance record has been received from John Martin, VK3ZJC, and Daniel Dobrosak, VK3KKW.

John and Daniel are claiming a new 1296 MHz mobile record distance worked of 138.2 km. John was using a 10 watt ICOM 1271 transceiver into a 0 dB gain cloverleaf antenna mounted on the ski bar of his van, and Daniel was using a 1 watt homebrew rig into a 6 dB gain Alford slot mounted on the roof rack.

As with all claims for new VHF/UHF distance records, this claim has been forwarded to the Federal Technical Advisory Committee (FTAC) in Canberra where all details will be closely examined.

MagPubs

As recently advised in Amateur Radio, and on Divisional news broadcasts, the overseas publications part of the WIA MagPubs operation was recently overhauled and is now bigger and better than ever before.

Monthly half page advertisements showing some of the greatly expanded range of publications now available are appearing in Amateur Radio magazine each month.

But, because of the expanded range of publications now available, members should realise that their Divisional Bookshop may not be able to carry all publications in stock at all times.

Divisional Book Shop officers have the latest list of publications available, so make sure you contact them first if you are contemplating purchasing a publication relating to amateur radio.

If your Divisional Book Shop does not have the particular advertised publication that you want in stock, then the expected delay in obtaining it should be no more than two to three weeks.

Log Book Covers

In the cleaning up and rationalisation of the Federal MagPubs operation, we found, to our surprise, a small supply remaining of the up-market and expensive log book covers that were produced several years ago and sold like hot cakes.

These dark blue, leatherette finished, solid covers with gold lettering on the front cover and the spine, are ideal to protect your valuable log book (the vertical, A4 type) and look very smart on the operating desk or in the bookshelves.

There are only 8 of these covers left in stock, and they are available to WIA members only at the reduced cost of $17.00, including packing and postage, from MagPubs at PO Box 300, Caulfield South, 3162, Victoria.

First in first served.

1989 Ross Hull Contest

Despite a number of initiatives, interest in the annual Ross Hull Memorial Contest has been gradually falling away over recent years, with only a handful of the limited number of people participating in the contest actually bothering to submit a contest log.

Given the vast size of our country, and the relatively small and uneven geographical spread of our population, it is very difficult to arrive at rules for a VHF contest which are equitable to all Australian radio amateurs.

This problem has concerned our hard working Federal Contest Manager, Frank Beech, VK7BC, for quite some time (I am convinced that the position of Federal Contest Manager must be one of the most demanding of the volunteer positions in the WIA structure).

Frank recently submitted a proposal to the Executive for approval of a new set of rules for the 1989 Ross Hull Memorial Contest. Executive examined the proposal with great deliberation, looking at both the advantages and the flaws, and finally agreed with all of Frank's proposals.

No one believes that these rules are going to solve all of the difficulties associated with this contest, but it is a different approach, and is a result of Frank listening to ideas and suggestions from a number of interested people.

These new rules will be published in detail in future issues of Amateur Radio, but the main changes are that the contest will take place over a shorter period, contestants will be able to operate from other locations than their home station for a couple of days during the contest, and the scoring system will be based on the Maidenhead Locator Squares.

If you are a VHF operator, give this year's Ross Hull Memorial Contest a try. And let us know how you think the new rules helped to make this year's contest a more interesting and exciting event.

DoTC and RFI

The new fee system for the DoTC investigation of interference complaints is expected to be introduced during October or November of this year.

As explained previously, there is no intention by the DoTC to charge a fee to the person causing the interference to broadcast radio or TV reception. So, under normal circumstances, if the transmissions from an amateur station are the cause of the interference, the amateur need have no fear that they are going to be charged a fee for the investigation of the

Continued on page 26

TECHNICAL

ON BUILDING A VSWR METER

REG FOOKES VK2AKY
19 DELAGOA PLACE CARINGBAH 2229

The main purpose of this dissertation is to pass on some wrinkles picked up during the exercise, rather than provide a complete recipe.

For a number of years I have used an Osker Block SWR-200 SWR and Power meter when adjusting my antenna tuning unit. While the SWR-200 is an excellent instrument, at 80m the sensitivity is rather inadequate, and at 160m virtually non-existent. So there was an incentive to acquire a more sensitive unit.

A literature search provided an abundance of designs, mostly of the current transformer type, so several mock-ups were tried. Maybe the problems were created by me, but in every case I found the alignment settings to be frequency-dependent. They could all be very nicely set up on 80m or 10m, but not both. It was noticeable that some of the designs went to great lengths in shielding, RF filtering and circuit symmetry, so perhaps this type is not as simple as it appears to be.

So the next thought was the old directional coupler concept (like the SWR-200). The slotted-line construction requires accurate mechanical work, and for increased sensitivity, large physical dimensions. It was decided to try the co-axial cable with inserted pick-up lines format.

Some preliminary trials and errors showed that to be able to null out the reverse currents and to have equal forward output from each pick-up line, it was necessary that:

1) each pick-up line be terminated by its correct Zo.

2) identical wire, ie cut from the same piece of stock, be used for each line.

3) the impedance of the RF source, transmission line and load should be the same as that for which the reflectometer is designed and adjusted. However, the error is not large if, say, a 50 ohm reflectometer is used with a 75 ohm RF system. The error can be practically eliminated by changing the pick-up line terminating resistors.

More than sufficient sensitivity on 80m was available with a 50 ohm directional coupler 14 inches (355mm) long with an RF power of 5 watts. It was quite satisfactory with an FT-101E at 160m. The alignment adjustments were independent of frequency (3.5-28MHz) within close limits.

Figure 1 is the circuit diagram, and Figure 2 the physical layout of the RF section. The wire used for the two pick-up lines was Teflon-insulated, silver-plated copper.

The principal contribution of this article is the method of constructing the directional coupler.

Directional Coupler Construction

For a reflectometer for use with a 50 ohm RF system, take a piece of good quality RG58 co-axial cable about 18 inches (450mm) long. Remove the PVC outer sheath from each end, being careful not to cut the braid wires, leaving the central 14 inches (355mm) intact. Pull out the centre conductor and polythene dielectric. At each end of the PVC sheath make a hole in the braid by pushing the wires aside and bend the two braid tails back so that a clear passageway is formed through the central section.

Neatly solder one end of a straightened length of 20 or 22 SWG copper wire about 3 ft (1m) long to one end of the co-ax inner conductor. Taper the adjacent end of the polythene dielectric.

Take a piece of Teflon-insulated, silver-plated computer wire-wrap wire about 3 feet long and cut it in the middle, (in my case the wire diameter was 0.009 in (0.23mm) and the overall diameter 0.019 in (0.45mm)). Solder one end of each piece to the copper pull wire just beyond the co-ax inner conductor. Fold back about half an inch at the end of the pull wire and thread it through the co-ax braid. The assembly should now look like Figure 3 (a).

Now comes the fiddly bit.

Clamp the free end of the pull wire in a vice and stretch it out by pulling on the co-ax inner section. Enter the two pick-up wires and the tapered end of the polythene into the opening of the braid, with the two pick-up wires diametrically opposite each other on the surface of the polythene. Ease the braid over the inner core/pick-up wires assembly by pushing the PVC outer sheath near the point

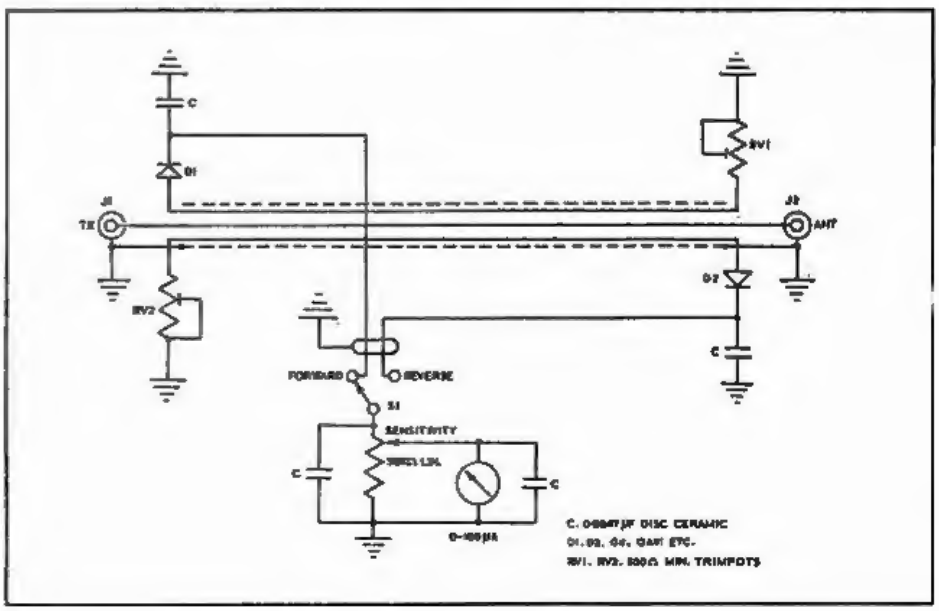

Figure 1

EMTRONICS OPENS IN W.A.

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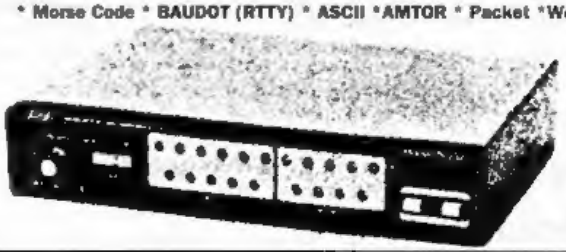

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where the end of the polythene is located. Use the finger and thumb to grip the sheath in the spaces between the two pick-up wires. As far as possible keep the two wires diametrically opposite and straight. Work the braid and sheath along the inner assembly until the ends of the pick-up wires appear at the second hole in the braid. Carefully feed the inner assembly through and continue working the braid along until about two inches of the inner core protrude. Cut the pull-wire free from the co-ax and pick-up wires. It should now look like Figure 3(b).

Trim all the ends, check for open and short circuits as appropriate and assemble it and all the other components into the metal case of your choice.

Alignment

Using 50 ohm co-ax connect a Tx to J1 and a non-reactive 50 ohm load to J2.

With S1 in the Forward position, adjust the RF level and the Sensitivity control to give approximately FSD on the meter.

Change S1 to Reverse and adjust VR1 to give minimum meter deflection.

Reverse the leads to J1 and J2 and repeat the nulling procedure by adjusting VR2, and remembering that the positions of S1 are now reversed.

Re-check with the leads in the original positions.

With a good dummy load the meter should barely flicker in the Reverse position, and this should apply over the frequency range 1.8-30 MHz. The sensitivity in the Forward position should be equal for both pick-up lines at any given frequency.

Table 1 relates VSWR and a meter scale of 0-100.

Reflectometers for other characteristic impedances can be made by using an appropriate type of co-ax for the directional coupler, and possibly changing the value of VR1 and VR2, but see section 3 of paragraph five. **ar**

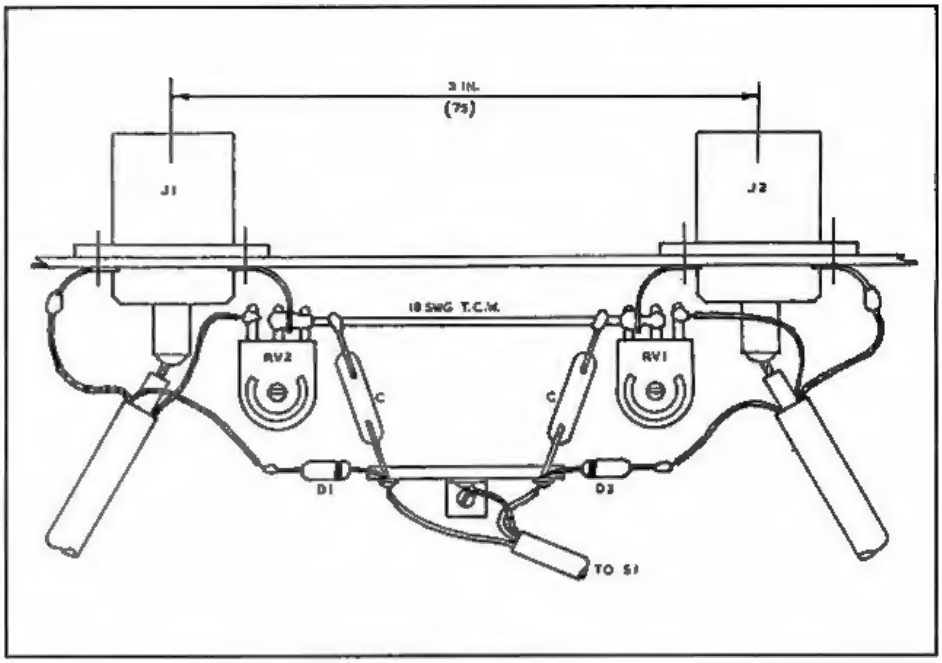


Figure 2

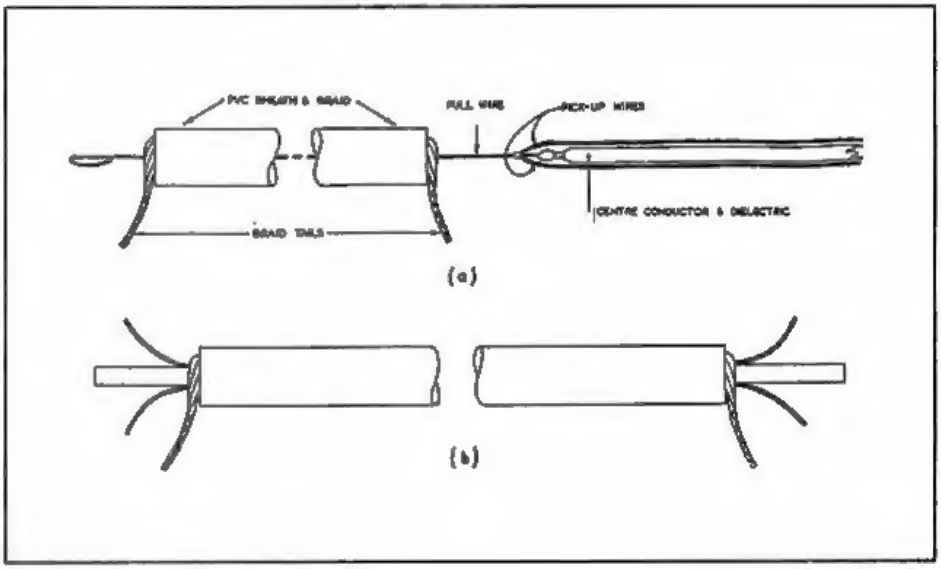


Figure 3

Table 1

VSWR	Meter	VSWR	Meter
1	0	1.8	28.6
1.1	4.8	1.9	31
1.2	9.1	2	33.3
1.3	13	2.5	42.9
1.4	16.7	3	50
1.5	20	5	66.7
1.6	23.1	10	81.8
1.7	25.9	?	100

THE 5/8 MYSTERY

DESMOND A GREENHAM VK3CO
16 CLYDESDALE COURT MOOROOPNA 3629

The great majority of 2 meter mobile operators use the old, well proven, quarter wave vertical antenna cut to around 19" (483mm) mounted somewhere on the vehicle. We all know that the most effective mounting spot is in the roof centre. However, even with XYL approval, it is not easy to bore a large hole in the roof of the new red Mercedes! So, the gutter or boot mount is the next most favoured method of antenna fixing with no permanent damage to the vehicle.

Most transceivers these days run around the 25 watts output and with this power and a well-tuned 1/4 wave antenna, many repeaters can be accessed reliably. However, if you live on the edge of repeater service area or you decide to travel, an increase in range is always useful. This can be achieved by increasing power or by using a more efficient antenna or possibly both.

Many articles have been written on mobile antennas of all different shapes and sizes, but one antenna always appears to retain its popularity, and that is the "5/8" (0 625 wavelength)

Why is it so effective and so much better than a 1/4, 1/2, 3/4 or full wave? Here are the answers: For maximum range on VHF it is desirable to radiate the signal at a low angle to the earth surface. There is little point in radiating most of the available energy up to the sky. Field radiation tests show that a 1/4 wave has a high angle of radiation and as we increase the antenna length up to 3/4 wavelength, the lowest radiation angle occurs at around 0.6 to 0.7 of a wavelength. Above 0.7 wavelength the radiation angle increases again, hence the familiar 5/8 figure (0.625). Antennas using this design are readily available commercially and perform very well exhibiting more than 3db gain over the familiar 1/4 wave. In general terms, 3db gain means an equivalent of twice the power. In simple terms, it makes your 25 watts radiate like 50 watts or better. This article will describe how to construct a 5/8 wavelength antenna at a minimum of cost.

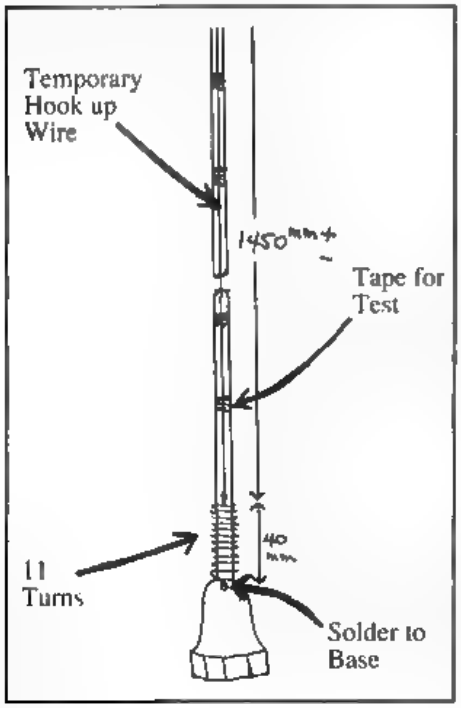


Figure 1

The first requirement is to find a CB antenna at least 1.5M in length. The condition of the antenna is not important providing the fibreglass rod and base are sound. There are many old damaged 27 MHz CB whip antennas available, so look around truck depots, trash and treasure sales etc.

Having obtained your antenna:-

Step One: Remove the old shrink tubing and the winding using a sharp knife. This will leave you with a clean fibreglass rod fitted to a standard base Check that the rod is firmly in the base

Step Two: This is a critical step and involves the winding of the base coil The coil simulates 1/8 wavelength and, in conjunction with the 5/8 wavelength antenna, produces an antenna with an electrical length of 3/4 wavelength which exhibits a low impedance match to produce a low SWR on the feed cable Find a 300mm length of 14# enamel wire - readily available from old power transformers etc.

Clean one end carefully and solder onto the base of the CB antenna (see sketch). Now wind on 11 turns spaced evenly over 40mm. Secure the wire with PVC tape or similar. Cut the wire and clean the end with a knife or razor blade Onto the end of the coil, solder a 1450mm length of hook-up wire and run it up to the tip of the antenna - tape it in position.

This is the temporary antenna and is used for the test and tune up only - it will be replaced with braid at a later step. See Fig 1

Step Three: Place the antenna on its mounting base on the vehicle with the required length of coaxial cable connected. Apply a signal to the feed line through a good quality SWR meter. Check the SWR at 144, 145, 146 and 147 MHz. The reading may be quite high, possibly 3:1 or greater. If the reading is lowest at 144 MHz, then the inductance is too large To reduce the inductance, spread the turns further apart and recheck SWR. When the SWR is below 2:1 at 144 MHz, the antenna length can be adjusted by cutting short lengths from the top of the hook up wire. By carefully adjusting the coil and the antenna length, a low SWR (better than 1.4:1) can be obtained on 144 MHz

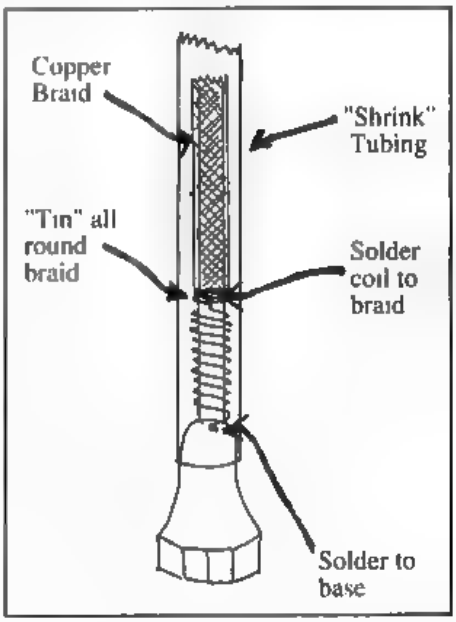


Figure 2

Step Four: Without disturbing anything, measure the length of hook-up wire used. This can now be removed, taking care to stop the coil from springing. The coil can be held using quick dry "aero" cement or "5 minute Araldite".

Step Five. This entails fitting braid to the antenna. Suitable braid can be purchased, but the easiest way is to find an odd scrap of coaxial cable. This can be stripped carefully and the braid contracted and removed. The braid is then fed over the fibreglass and pulled tight. The lower end is soldered to the coil end and the top 50mm is "tinned" to prevent unravelling See Fig 2

Step Six: The antenna can now be checked again for SWR. There may be a slight change due to different diameters of the radiating part of the antenna. A small adjustment of the coil and/or overall length may be necessary. When you are finally satisfied and have the SWR down to an acceptable figure we come to the last stage.

Step Seven: From your local radio or electrical supply shop you can purchase, for a modest sum, a length of "shrink" tubing, 18mm wide. Feed the tubing over the antenna from the top and make sure the tubing covers the base coil and part of the metal base. When this has been fitted, carefully rotate the antenna over a gas or electric stove burner to effect a "shrink". Do not overheat or you will burn the tubing. When the tube has shrunk all over and the antenna looks like the "real thing", check the SWR again and, if necessary, trim the tip by cutting off with a fine tooth hacksaw. Only trim 1/4" at a time or you will overcut and spoil an otherwise good antenna

Conclusion

You now have a top quality 5/8 wavelength antenna and your outlay should have been well under $5 00. Your 25 watts will now sound like 50 watts and you will experience a worthwhile increase in mobile range, working simplex or through your favourite repeater. **ar**

'MOSFET-4' VFO CW TRANSMITTER FOR 80m

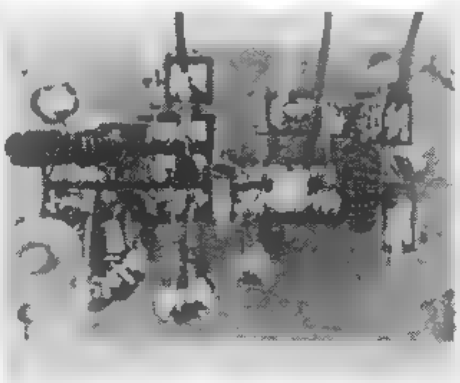
Drew Diamond VK3XU
"Nar Meian" Gatters Rd Wonga Park Vic 3115

Hands up those who have been rockbound on 80 metres with one crystal and a mighty 4W of RF power How many of us have cursed this one crystal, and wondered why no one will answer our CQs, or why it is that there always seems to be some private net operating there whenever the desire is felt for a nice little CW QSO? The 4W transmitter in AR of April '86 certainly was a popular project. However, only crystal control was offered A number of experimenters managed to adapt VFO control, but with varying degrees of success. The CW end of 80m can become very crowded, so with only 4W of crystal controlled signal, operating can become very frustrating, even for the most dedicated QRP fan!

Here is an updated transmitter for you to try. The power MOSFET PA and driver have been largely retained from the original project. The VFO uses the classic Hartley configuration followed by a dual gate FET buffer. Parts count has been kept to a minimum without sacrificing the desired features of a CW transmitter; frequency and circuit stability, purity of output signal, cleanliness of keying and tolerance of load mismatch.

Measured Performance

Frequency Range:	3.500 to 3.700MHz.
Frequency Stability	Less than 100Hz drift in any 10 minute sending period
Output Power:	Nominally 4W, typically 5W into 50 ohms from a 12Vdc supply.
Spectral Purity:	Harmonics at least -55dBc.
Keying Ratio:	At least 90dB, with no detectable chirp or click
Output Protection:	Will withstand any SWR, including short or open load, without damage Remains stable regardless of SWR.
Power Supply:	Nominally 12Vdc at 1A.



VFO Board

Circuit Description

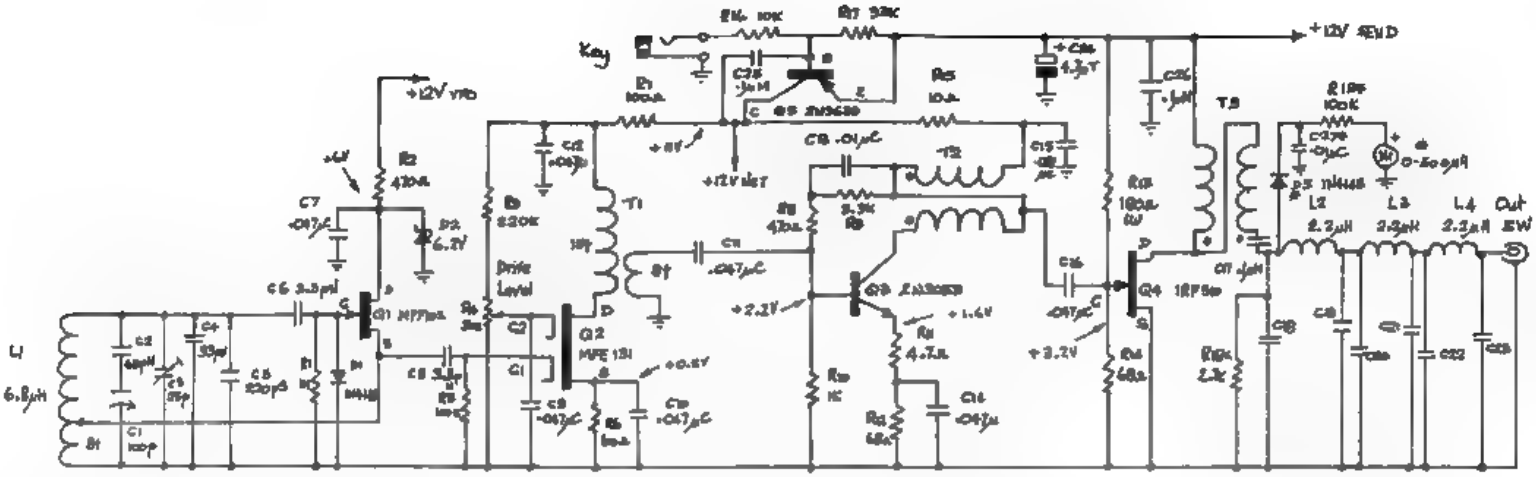
A Hartley oscillator maintained by Q1 supplies the chosen frequency between 3.5 and 3.7MHz. For frequency stability, any VFO must run at a fairly low power level, so the signal must be raised in discrete stages to the final power level (4 or 5W in this case). A dual gate FET buffer amplifier at Q2 follows the VFO and raises the power level to about 1mW at the secondary of broadband transformer T1.

The gain of this stage may be varied by adjusting the voltage on gate 2, so providing a means of changing the output power from about 1W to 4W. A broadbanded driver stage at Q3 raises the signal by about 20dB and supplies 100mW of power at T2

To generate a crisp but clean CW signal the carrier is interrupted by keying the positive supply to Q2 and Q3 (we could key the oscillator only, and this was tried during development, but the resulting signal was considered to be too chirpy). The supply is ramped up and down by Q5 in response to the key Rise and fall times are determined mainly by the value of C25. The value shown, 0 1uF provides crisp keying. A larger value such as 0 33uF would yield softer keying if this is preferred.

A power MOSFET at Q4 has a stage gain of about 17dB, and raises the power level to about 5W The IRF510 device employed here was intended by Motorola

'MOSFET' VFO CW TRANSMITTER FOR 80m.



All resistors ¼W 5% except R18, which is 1W.
All capacitors > 16V. Voltages measured; Send, 'key down'.

C18-C23 = 33pF

L1: 6 8μH; 33 turns # 24 B&S (0.5 mm) enam. wire on Amidon T68-2 core tapped 8 turns from earthy end

T1: Primary 16 turns # 22 B&S (0.6 mm) on Amidon FT50-43 toroidal core. Sec. 8 turns #22 wound in the gap

T2, T3: 14 loops bifilar # 24 B&S on Amidon FT50-43 core

L2-L4: 18 turns #22 B&S on Amidon T68-2 core

MPF102, MPF103

MPF131, 40673.

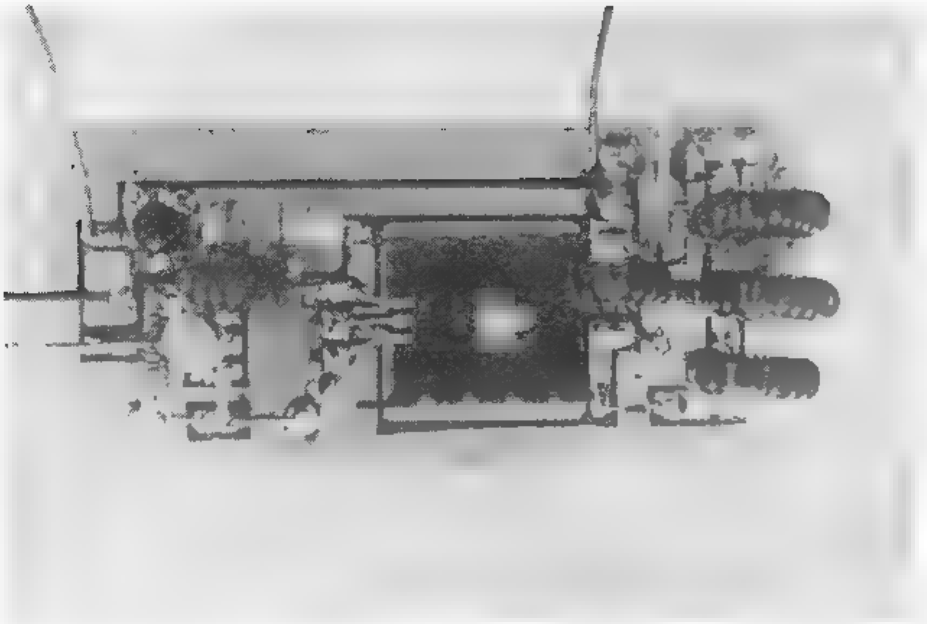
2N3053B, BFY50

2N3638, 2N3640, PN3638, PN3640

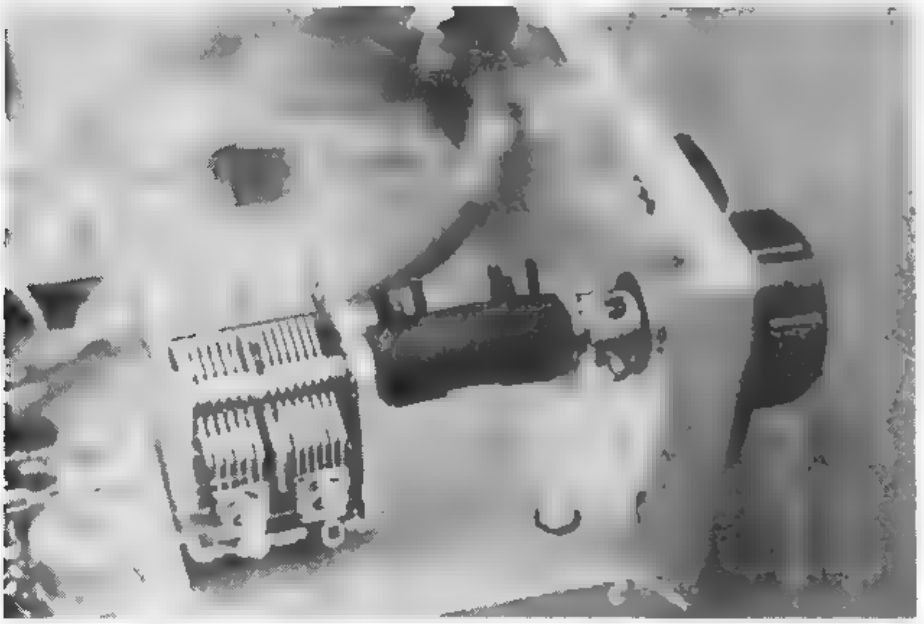
IRF510

μC = Ceramic
μM = Monoblac
μT = Tantalum
pN = N.P.O ceramic
pS = Styroseal

VFO CW TRANSMITTER		
FOR	80m	VK3XU
Drawn	D C D	23-5-89



Driver and P A Board



Detail of flexible coupler

for use in switching power supply applications. Because of the speed capability however, these devices make a very nice amplifier, up to about 10MHz depending on circuit configuration. As the PA in a transmitter of this power level, the MOSFET is nearly ideal, as they are very tolerant of load mismatch, thermally stable (within limits), and are not so "gainy" at HF as to be always trying to oscillate. Present cost of this device is around $3.00 The output impedance of the PA may be approximated by;

$$Z = \frac{Vcc^2}{2Po} \text{ ohms}$$

Where Vcc = 11V (assuming 1V drop across the drain-source), and say 4.5W output power, so 2Po = 9.

Therefore,

$$Z = \frac{121}{9} = 13.4 \text{ ohms}$$

A 4:1 transformer at T3 steps this impedance up to 53.6 ohms, which provides a satisfactory match to our usual 50 ohm antenna load. An amplifier like this can produce a significant amount of harmonic output, so a three section low-pass filter is included to reduce these harmonics to a satisfactory level.

An RF voltmeter has been provided to give a visual indication of output power. If an external meter is available, such as an SWR meter, as is usually the case, then this part may be omitted.

Construction

I would have liked to offer a conventional printed circuit board for this project, but unfortunately the facilities to which I once had access have been dismantled. During "breadboarding" and development of this project, all kinds of construction methods were used, and it was found that the overall circuit was quite stable provided the components are wired onto or above a metallic ground plane. So just about any construction method that you feel comfortable with will probably work satisfactorily.

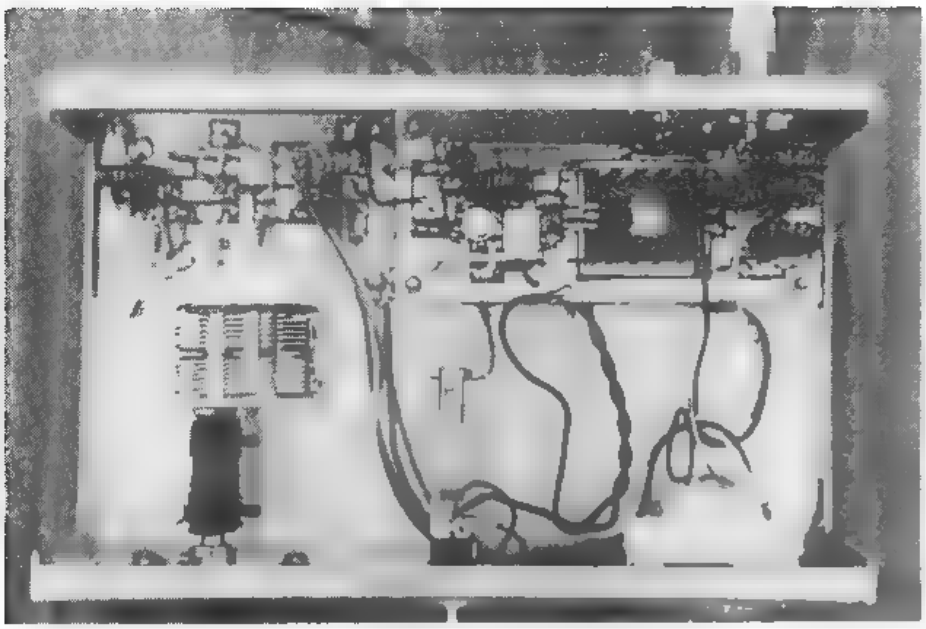
The components of my own transmitter are accommodated upon the copper side of two home-made printed circuit boards. So that any heat generated by the PA, and particularly the IRF510 cannot reach the VFO too quickly, a degree of thermal isolation is obtained by building the VFO and buffer on one board, and the driver and PA on a separate board.

Double or single sided board may be used if the suggested layouts are adopted. As you can see from the photo the components have had their leads cut to length, then simply soldered onto the copper pads of the board. The resistors may be mounted vertically if this is easier for you. The only holes required are one on each corner of the boards, and one for mounting the PA MOSFET. See Ref 1 for notes on home-made circuit boards.

The IRF510 will need a 6030 heatsink attached. A smear of heatsink compound or petroleum jelly must be applied between the MOSFET/heatsink interface to aid heat transfer As the drain is connected to the mounting tab, do not forget to fit an insulated washer under the head of the screw which secures this device to the board

The photo shows the wound components soldered in position, and no trouble should be experienced with the coils. However, the broadband transformers T2 and T3 could be a bit tricky if you have not made these before

To make these; take two 300mm lengths of #24B&S (0 5mm) enamelled copper wire. Lay them parallel to each other, then twist the wires together at



Internal view

one end. Place this end of the pair in a vice. Twist the other ends together, then fix them in the chuck of a hand drill. Whilst keeping the wires taut; turn the drill until you have about three twists per cm. Give the drill a pull to set the twist, then remove the pair. Carefully wind this onto an FT50-43 toroidal core. About 14 loops should fit just nicely. Winding starts are marked on the schematic with a dot. The end of one winding must be connected to the start of the other winding to form the tap. Use your multimeter on ohms to identify starts and ends.

To protect the VFO from stray fields and the effects of air draughts (which will cause the VFO frequency to change), the transmitter should be housed in a metal box or cabinet. There are a number of ready made boxes available off the shelf. The one shown in the photo is a K&W #C853 which measures 20 5W x 13D x 6.5Hcm. Some holes must be provided to allow ventilation of the PA MOSFET.

To permit accurate frequency setting it is desirable that the VFO variable capacitor C1 should be driven by a vernier dial.

These have become expensive however. Dick Smith can supply one similar to that used in the prototype for about $15.00. As only 200kHz is covered by this VFO, it is possible to get by with a straight shaft and knob connected to C1. Netting will just take a bit more practice, and there will be no mechanism provided to prevent unintentional movement of the capacitor shaft

Some sort of insulated flexible coupler should be interposed between the capacitor and drive (to prevent wear due to misalignment, and frequency changes due to alternate ground paths). These too have become "rare as hen's teeth". Those with access to machining facilities will no doubt be able to make something. Illustrated is my own approach to the problem: The 0.25" off-cut from the shaft of the 50K pot has been fitted into the vernier drive. A 3cm length of 0.25" I.D. rubber tubing (eg. fuel line) is fitted over the shafts where they almost meet and is fixed there with fuel filter clips. For further notes on VFO practicalities, see Ref 6.

When the transmitter is delivering its full output, about 1A will be drawn from the supply. There is plenty of circuit information around for 12V/1A power supplies using the 7812 type regulator chip, and need not be repeated here (see AR Oct '86).

Alternative PA

As an alternative to the PA used here, the MOSFET PA amplifier described in AR Oct '88 may be directly substituted. This amplifier can supply up to 8W into 50 ohms from a 13V supply.

Commissioning

Check that all components are correctly positioned and oriented. Pay particular attention to polarised components. A 50 ohm power meter/dummy load would be ideal for testing this transmitter off air. A 12V/5W globe would also provide a reasonable load (30 ohms).

With the cover off the cabinet, it should be possible to hear the VFO on the station receiver when S1 is placed in the 'net' position. With the plates of C1 fully meshed; adjust C3 so that the VFO is oscillating at exactly 3.500MHz. Check that the frequency can be adjusted to about 3.7MHz when C1 plates are fully open. If for some reason C3 cannot bring the lowest frequency to 3.500MHz, it may be necessary to change the value of C4. 10pF would increase the frequency,. 47pF would lower it.

When all is right with the VFO, it is recommended that the VFO tank coil L1 should be secured to the board. A small piece of perspex or bakelite may be fixed with epoxy cement between board and coil to provide this anchor.

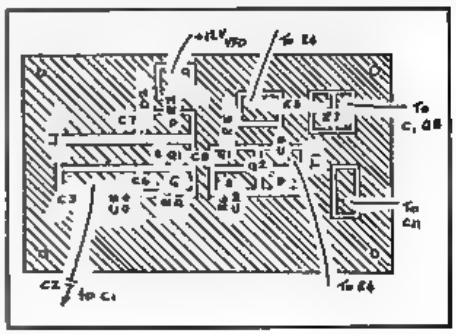
With the drive level pot set to minimum and S1 in the send position, close the key. About 1W will be indicated on the power meter, or the globe dimly lit. Increasing the drive should result in a smooth increase in power to about 4 or 5W. Because of thermal inertia, a globe makes a very poor dummy load for testing transmitters, so the keyed signal may

'Mosfet-4' CW transmitter

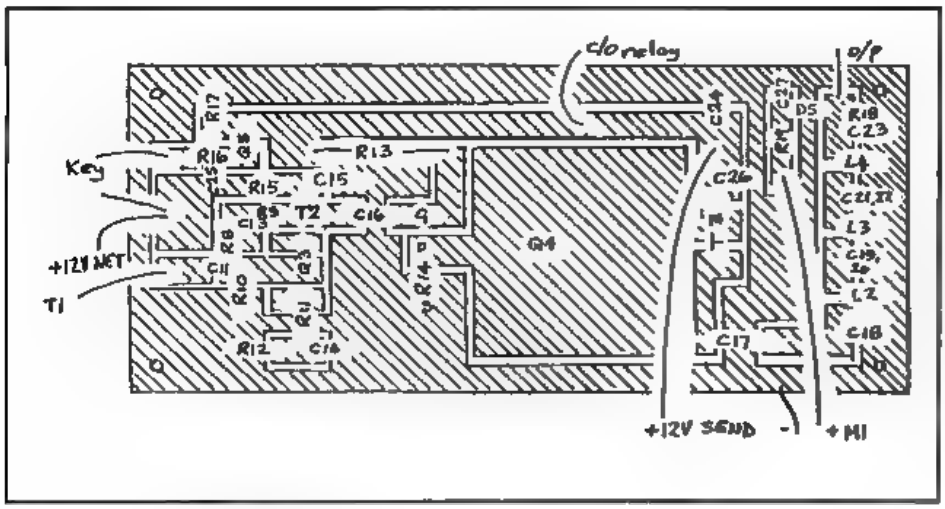
sound a little strange. A resistive dummy load could consist of 4 parallel 220 1W carbon resistors soldered to a coax connector to suit. Listening to the signal terminated in a resistive load will give a much better idea as to what the 'on-air' quality will be like.

If accurate frequency measuring facilities are available, it would be a good plan to make a calibration curve or table so that the VFO frequency can be set with a degree of confidence.

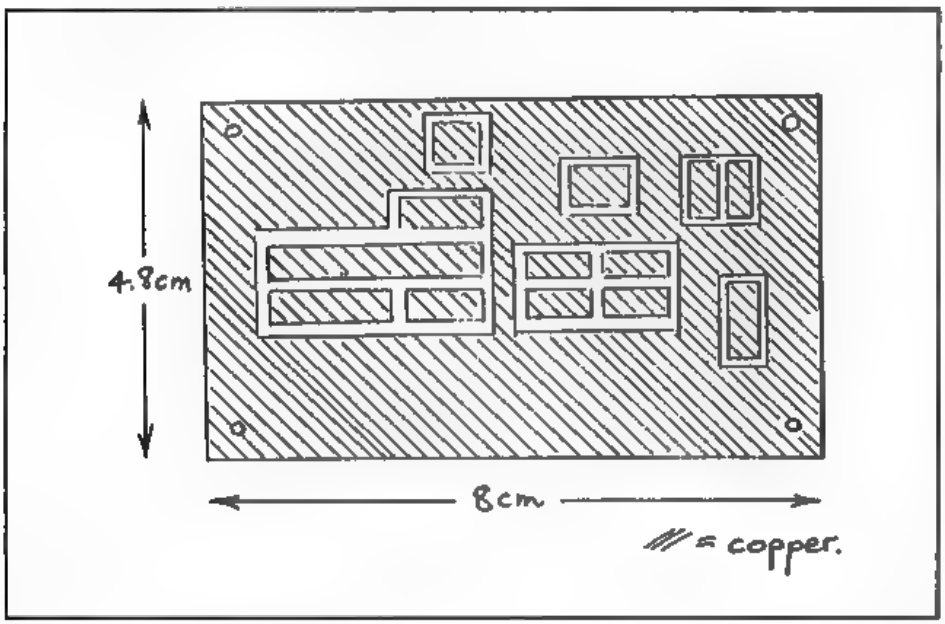
During on-air operation, the cover must be fitted to the box, otherwise RF energy



Component locations, VFO



Component locations, Driver and PA



Circuit Board, VFO, full size

may enter the VFO circuitry and cause frequency pulling and other strange effects.

Problems

Some key voltages are shown on the circuit as an aid to troubleshooting should this be necessary. If, after fruitless attempts on your part, you cannot get your transmitter to work properly, write to me about it, and I shall extend any reasonable amount of help necessary. Details can also be provided for a suitable power supply if required. Please include a SASE.

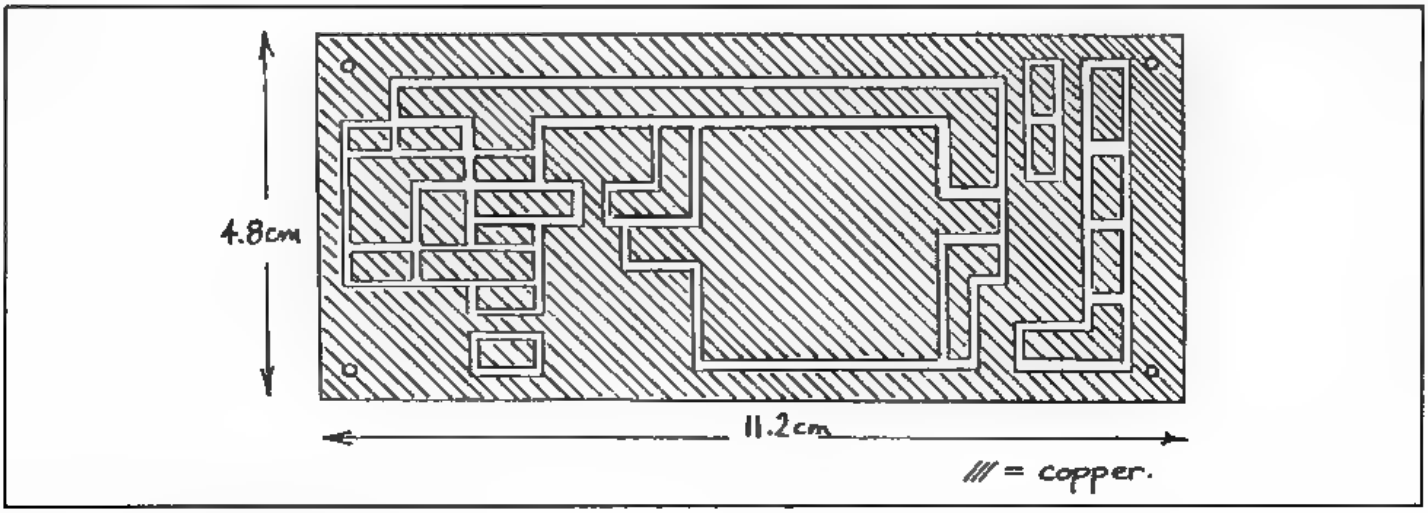
Parts

All the components used in this project are readily available at present. Suppliers of Amidon cores regularly advertise in this journal. The IRF510 MOSFETS are known to be available from Motorola distributors. Variable capacitors should be obtainable from Jaycar and Electronic World (Croydon, Vic.). All other components are available from the usual electronics parts suppliers.

See page 15 for parts list.

References and Further Reading

1. Method of Making Home Made Circuit Boards; AR Oct '88 page 9
2. Power MOSFET Transistor Data Book, Motorola.
3. Practical RF Design Manual, DeMaw, ISBN 0-13-693754-3.
4. 3.5MHz 5W CW Transmitter, Fletcher RADCOM Nov. '87.
5. Solid State Design, DeMaw & Hayward, ARRL.
6. Some Practical Tips On VFO Construction, Novice Notes, AR Jan. '88.



Circuit Board, Driver and PA, full size

Parts List - Estimated Cost: $60 - $70

Capacitors	
3.3pF NPO ceramic	C6, 8
25pF trimmer (preferably air)	C3
33pF NPO ceramic	C4
68pF NPO ceramic	C2
100pF variable	C1
220pF styroseal	C5
820pF styroseal	C18, 19, 20, 21, 22, 23
0.01uF ceramic	C13, 27
0.04uF (or 0.1uF) ceramic	C7, 9, 10, 11, 12, 14, 15, 16
0.1uF monobloc	C17, 25, 26
4.7uF tantalum, 16V	C24
Resistors	
4.7 ohm 1/4W 5%	R11
10 ohm 1/4W 5%	R15
68 ohm 1/4W 5%	R12, R14
100 ohm 1/4W 5%	R6, 7
180 ohm 1W, 5%	R13
470 ohm 1/4W 5%	R2, 8
1K ohm 1/4W 5%	R10
2.7K ohm 1/4W 5%	R18
3.3K ohm 1/4W 5%	R9
10K ohm 1/4W 5%	R16
33K ohm 1/4W 5%	R17
50K linear pot	R4
100K ohm 1/4W 5%	R5, 19
220K ohm 1/4W 5%	R3
1M ohm 1/4W 5%	R1
Semiconductors	
MPF102, MPF103	Q1
MFE131, 40673	Q2
2N3053, BFY50	Q3
IRF510	Q4
2N3638, 2N3645, PN3638	Q5
1N4148, 1N914	D1, 3
1A diode	D4
6.2V, 400mW zener	D2
Wound Components	
Amidon T68-2 toroidal core	L1, 2, 3, 4
Amidon FT50-43 toroidal core	T1, 2, 3

Miscellaneous

Cabinet box to suit, printed circuit material, DPDT centre off switch (S1), 500uA meter, 6030 heatsink, key jack, output coax connector, relay connector, vernier dial, pot knob, flex coupler (see text), screws, nuts, spacers, hook-up wire, #22 and 24 enam. wire, solder etc.

ar

AN RF POWER LINEAR USING IRF MOSFETS

LLOYD BUTLER VK5BR
18 OTTAWA AVE PANORAMA 5041

Here is a 50 watt PEP amplifier, using low priced transistors, which can be used on the lower frequency amateur bands.

Introduction

I was interested to read the article by Drew Diamond VK3XU (Notice Notes, AR Oct 1988) on the application of the IRF series MOSFET transistor for broadband linear RF amplification. Drew's amplifier used a pair of Motorola IRF510 transistors to generate 5 or 6 watts of peak envelope power from a 13.5V supply and operated within the frequency spectrum of 1.8 to 10 MHz.

I thought it might be of further interest to describe a higher power version of a linear amplifier which I had reason to design, some time ago, using two IRF430 transistors. The amplifier was required to deliver 50 or 60 watts of peak envelope power in the MF spectrum. Whilst, at the time, amateur band transmission was not in mind, subsequent tests have shown the circuit can deliver a power of 55 watts at 1.8 MHz, 40 watts at 3.5 MHz and 25 watts at 7 MHz. The IRF430 transistors used were the International Rectifier (IR) type called HEXFET because of their hexagonal source cell structure. (Refer to the appendix at end of article.)

Secondary Breakdown

An attraction in choosing the MOSFET transistor in preference to the bipolar transistor is the absence of second breakdown. An explanation of this, extracted from the IR handbook, is given in the following paragraph:

> One of the outstanding features of IR's power MOSFET is that they do not display the second breakdown phenomenon which is frequently the Achilles heel of bipolar transistors. A simple physical explanation accounts for this superiority. If localized, potentially destructive, heating occurs within a MOSFET transistor, the carrier mobility in that area decreases. As a result the MOSFET has a positive temperature coefficient and acts in a self-protective manner by forcing currents to be uniformly distributed through the silicon die. In contrast a bipolar transistor, particularly under conditions of high collector-emitter voltage, displays "current crowding" in the base region, which causes hot spots. Because of the bipolar's negative temperature coefficient, these hot spots tend to further "hog" the current and cause instantaneous, catastrophic destruction of the die.

On the face of it all, the problems of thermal instability, which normally have to be considered in the bi-polar power transistor, could be solved by the use of the MOSFET power transistor. In setting up the amplifier under discussion, this was found to be not quite true. The push pull amplifier was biased to operate in a nominal class B mode with a standing drain current of 150 mA per transistor and a current swing up to 1 amp per transistor at full power. The power supply used was nominally 60 volts. Figure 1 shows the limiting conditions of drain current and source to drain volts for the IRF430 transistor. Pq is the static operating point set and Pm the point of maximum current swing.

The heat sink was designed so that, at continuous full power, temperature rise at the transistor junctions would be within the limits specified for the transistor. However, under continuous operation at full power, an effect similar to thermal runaway in a bi-polar transistor was experienced.

The explanation of this runaway effect is found in the transfer characteristic curves (refer figure 2). For a junction temperature of 25 degrees C, a standing current of 150 mA is achieved with a forward gate to source bias of 3.5V. At a junction temperature of 125 degrees C and the same bias, standing current rises to nearly 0.5 amp. To maintain the standing current at 125 degrees the same as it is at 25 degrees, bias must be reduced to 3.1V. Clearly, some form of circuit is required which senses the junction temperature and reduces the bias voltage as the temperature rises.

One might be tempted to draw another conclusion that because of the insulated gate, with extremely high input resistance, the MOSFET can be driven from a virtual voltage source supplying negligible power. However, the power MOSFET has very high input capacitance; in the case of the IRF430, around 700 to 900 pF. For a broadband amplifier, this capacitance must be loaded down with shunt resistance so that the impedance presented to the driving amplifier is reasonably constant over the required frequency range. A small amount of drive power is therefore consumed in this resistance load The other alternative is to have a tuning system at the input which is used to resonate the circuit at whatever specific frequency is in use.

The Circuit

Detail of the circuit is shown in figure 3. Gate to source biasing is developed from a 15V supply through a resistive network The individual static current in each transistor is set to 150 mA by potentiometers R1 and R2. A thermistor, cemented to the transistor heat sink as close as possible to the transistors, senses the temperature and reduces the bias voltage to correct for the rise in drain current as the temperature rises. (Referring back to Drew's article, it can be seen that he used a diode, fixed to the heat sink of his amplifier, for the same purpose.)

Each transistor gate is loaded down with a 200 ohm resistor selected to mask the input capacitive reactance within the MF range. (These same resistors were left installed for the amateur frequency tests.) At lower frequencies, drive power is essentially that required to develop the required voltage swing across these resistors. At amateur band frequencies, input impedance is essentially the input

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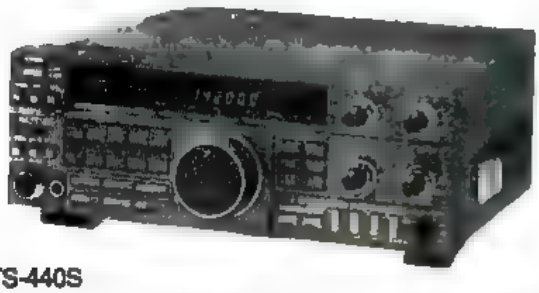

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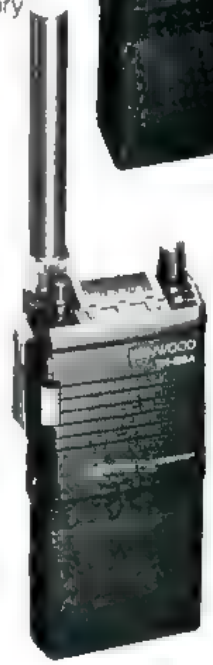

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capacitive reactance of the MOSFET transistors and lower values of load resistance could have been considered. R11 and R12 are parasitic suppressors which should be mounted directly on the transistor gate pins These were included as a precaution rather than because of any problem experienced.

Based on continuous tone modulation and 60 watts PEP output in the MF region, power dissipation is around 30 watts per transistor. (This is a nominal value as both maximum power output and efficiency fall as the frequency rises. We discuss this further in a later paragraph.) Thermal resistance of the transistor junction to its case is 1.67 degree C per watt. Allowing a further thermal resistance of 0 2 degree C per watt across the transistor insulating washer, 30 watts dissipation gives a temperature differential between the junction and the heat sink of 56 degrees. Defining maximum temperature as 40 degrees C and given the maximum allowable junction temperature which is 150 degrees C, the maximum allowable temperature rise in the heat sink is (150 - 56 - 40) = 54 degrees. For two transistors dissipating 30 watts, the heat sink must therefore have a thermal resistance of 0.9 degrees C per watt.

If tone tests were limited to short transmission periods and if the amplifier were only intended for SSB speech, average dissipation per transistor could be considered to be around 10 to 15 watts. Calculating on this dissipation, the thermal resistance of the heat sink could be around 2.5 to 4.5 degrees per watt. A 150 mm length of Mullar 35D heat sink would do nicely.

The heat sink actually used was 200 mm of Mullard 55D type material. Conservatively selected on the basis of continuous power in the amplifier, it is somewhat of an overkill for sideband speech transmission with lower average power and for this application, a smaller heat sink could be used, as suggested in the previous paragraph. Beryllium insulating washers were fitted because of their low thermal resistance. (There is not much point in having a large heat sink if a high temperature gradient is allowed to build up across the insulating washer.)

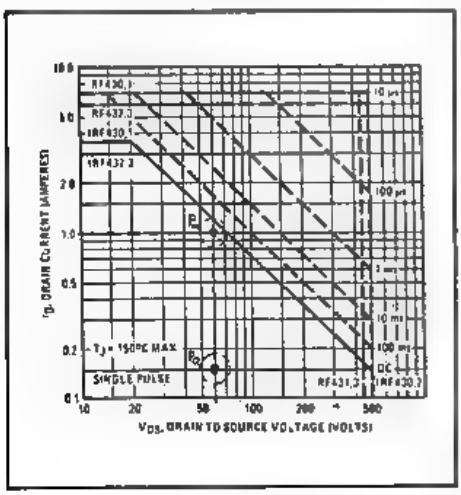


Figure 1 IRF430 - operating condition within maximum safe operating area

The output coupling transformer, made up by quadfilar winding on a 29 mm ferrite toroidal core, reflects a drain to drain load resistance of 50 ohms at its primary windings from the 50 ohm output circuit. Maximum output power (Pm) is calculated from the following:

$$Pm = \frac{2(Vp)^2}{Rdd}$$

Where Vp = peak voltage swing
& Rdd = drain to drain load resistance.

At low frequencies, the value of Vp approaches the voltage of the supply rail giving an output power calculation of over 100 watts. As frequency is increased, a limiting factor on the value of Vp called slew rate comes into effect. Slew rate is the maximum instantaneous change in output voltage that the amplifier can deliver in a given time. If we consider an output signal waveform, the maximum rate of change in voltage of the waveform, or the maximum slope of the waveform, increases with both frequency and amplitude of the waveform (refer figure 4). For a given frequency, maximum possible output voltage is achieved when the slope equals the amplifier slew rate. When frequency is increased, the maximum voltage swing is reduced and so also is the maximum power output. This explains why we can only get 55 watts at 1 8 MHz and an even lower value of 25 watts at 7 MHz.

The problem of limiting slew rate can be dealt with by using a higher frequency type of power transistor, but it will cost more. The IRF430 can be purchased for about 4 or 5 dollars, considerably less than a 'hot' RF type. This gets back to the basis of Drew's article in making an amplifier suitable for the lower frequency amateur bands with moderately priced transistors. Actually, the IRF510 transistors used by Drew are a little faster than the IRF430 but of course rated for lower power.

Power Supply

The power rail selected was 60 volts, supplied via an ILP 225 VA toroidal power transformer, bridge rectifier and simple capacitance filter. Regulation was considered adequate at around 6% For SSB speech transmission, the transformer rating is a considerable overkill and a more economical approach might be to rewind the secondary of an old valve receiver power transformer. A secondary winding of 50 volts at around 1.5 amp rating should be satisfactory.

A further 15V rail was derived from the 60v supply via a voltage regulator. This rail, used elsewhere as a general system supply, is also used as a source to bias the IRF430 transistors.

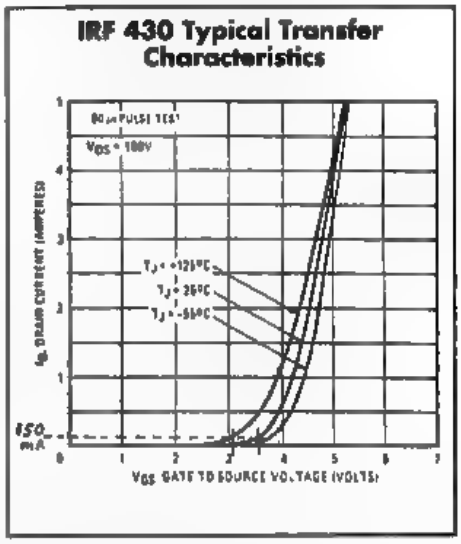


Figure 2 Over a temperature range of 25 degrees C to 125 degrees C, a change in gate to source bias volts of 3.5 to 3.1 volts is needed

Harmonics

Odd order harmonic level at the output of the amplifier is quite high and as is usual when using a broadband amplifier to feed an antenna, an efficient harmonic filter for each band is required. The filter should have at least 50 dB of rejection at the third harmonic frequency. Design of suitable low pass filters is given in amateur radio handbooks Design information has also been given in previous issues of AR, in Drew's article (ref 3) and in one of my own (ref 4). If toroidal cores are used to construct the inductors, iron dust cores and not ferrite types are recommended. The ferrite cored inductors have been found to change their value of inductance when high power is pumped through them, resulting in de-tuning of the filter The iron dust cored inductors are more stable in this respect As an alternative, air cored coils can be made with quite high Q and are quite satisfactory. They also cannot saturate so that they are very stable and are certainly cheaper to construct, even if they are a little larger

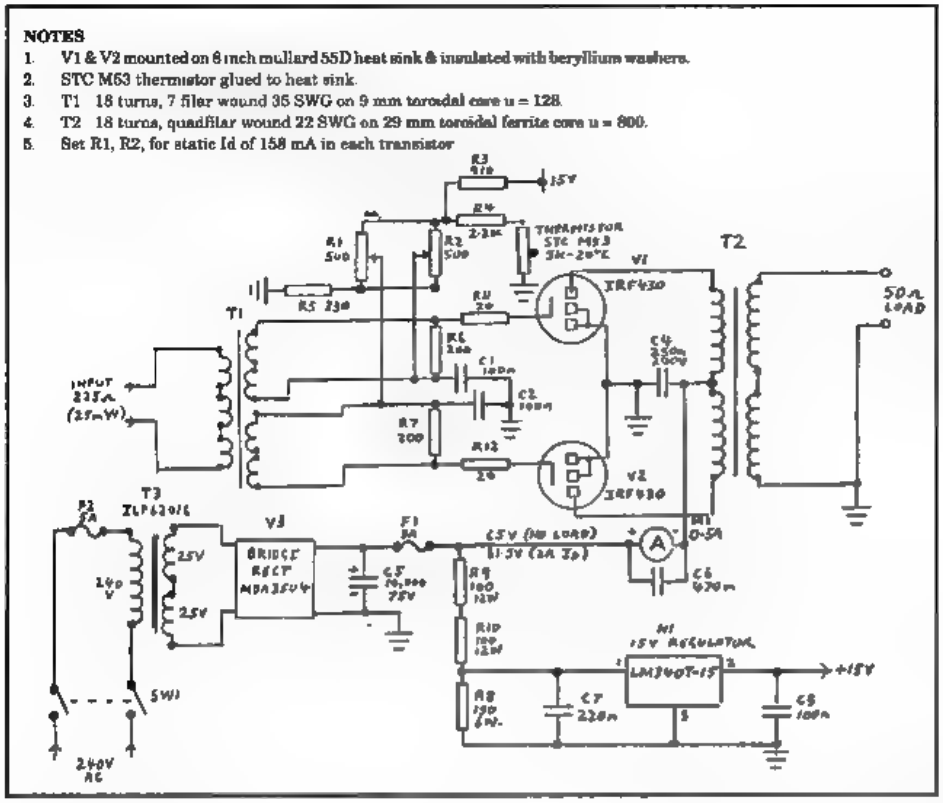
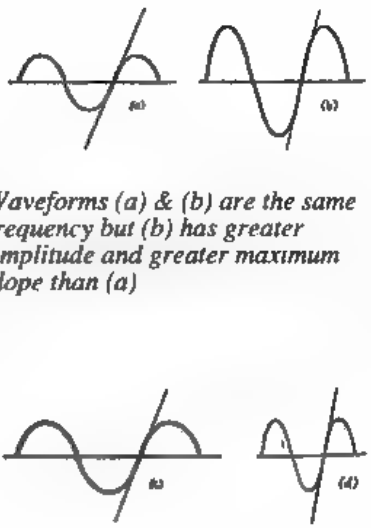


Figure 3 Linear Amplifier Circuit Diagram.



Waveforms (a) & (b) are the same frequency but (b) has greater amplitude and greater maximum slope than (a)

Waveforms (c) & (d) are the same amplitude but (d) is a higher frequency and has a greater maximum slope than (c).

Figure 4 Maximum slope of waveform increases with both amplitude & frequency.

Operation

With no signal input, the transistors are individually set for a static drain current of 150 mA. To do ths, the alternate drain circuit is opened whilst the relevant bias potentiometer (R1 or R2) is adjusted.

To check maximum power output at a given frequency, the amplifier is connected to a 50 ohm dummy load and the AC output voltage across the load is monitored with a CRO. The input can be fed from a standard RF signal generator as ;around 25 mW is all that is needed to drive the amplifier to full power. The input level is increased until the output waveform shows limiting and the peak to peak voltage (Vpp) is then recorded. Maximum power output (Pm) is given by:

$$Pm = \frac{Vpp^2}{400}$$

Total drain current should not be allowed to exceed 2.2 A and if the heat sink is not designed for continuous signal operation, the current should not be sustained for more than a brief period.

As discussed previously, the higher the operating frequency, the lower is the peak to peak voltage swing (and hence drain current swing) achievable without serious waveform distortion. Amplifier efficiency is decreased with a rise in frequency, but as maximum drain current is also decreased there is no problem of increased power dissipation and subsequent rise in heat sink temperature at the higher frequencies.

Summary

The reasonably priced IRF MOSFET transistor can be used to provide moderately high power amplification on the lower frequency amateur bands. Maximum power output decreases as frequency is increased but quite reasonable performance can be achieved at 1.8 and 3.5 MHz using an amplifier such as the one described. The amplifier is still usable at 7 MHz but at reduced power.

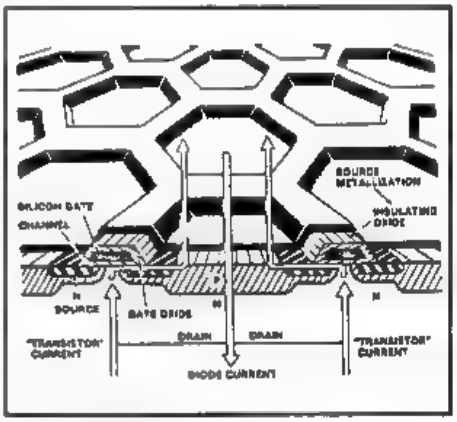
References

1 International Rectifier HEXFET Databook - Power MOSFET Application & Product Data.

2 Motorola Handbook - Power MOSFET Transistor Data.

3 Drew Diamond VK3XU - MOSFET Power Amplifier for 1.8 to 10.1 MHz - Novice Notes, Amateur Radio, Oct 1988.

4 Lloyd Butler - Tank Circuits & Output Coupling - Amateur Radio May 1988, plus corrections July 1988.



The HEXFET Structure

The HEXFET surface is characterized by a multiplicity of closed hexagonal source cells (over 500,000 per square inch) from which the name HEXFET is derived. In cross section, the HEXFET is based on a double-diffused (DMOS) structure. A channel is formed by double diffusion at the periphery of each hexagonal source cell. An insulating gate oxide layer covers the channel. A silicon gate then overlays both the insulating oxide and channel. The silicon gate in turn is insulated from the source by an additional

Continued on page 21

DECIBELS MADE EASY

MERVYN EUNSON VK4SO
BOX 1513 GPO BRISBANE QLD 4001

It all started innocently enough when Alexander Graham Bell invented the telephone.

You see, as wires were strung at length, distance naturally caused a power loss. At 10 miles or so, the measured power dropped to one-tenth of its original value. This was adopted as a unit, called the Bel, after the system's inventor.

Note that right from the start, this was a RATIO of output power to input power. It was immaterial what the actual levels were in watts (or milliwatts or whatever). Later, when amplification became possible, a gain was expressed as a + value, and a loss as a - value.

The unit was too large in practice, but dividing by 10 gave the decibel, abbreviated to dB. And conveniently, one decibel was the minimum change in level detectable by the human ear.

Now the ear, being superbly engineered, responds to the full range of natural sounds from a faint whisper to a massive explosion one-million-million times (10^{12}) greater. All this is compressed into a scale of 120 dB. When sound reaches this upper level it has crossed the threshold of feeling to cause pain.

A perfect form of automatic-gain-control or agc is built in to the ear. Sound itself has two characteristics, frequency and intensity, which our mental responses perceive as pitch and loudness: both vary exponentially or logarithmically as the applied stimuli. Thus a solo piper sounds fine (0 dB), two pipers together only slightly louder (3 dB gain), and ten in a pipe band just twice as loud as one (+ 10 dB). To obtain twice the sound of one such band, one hundred massed pipers are needed (+ 20 dB).

So, power has to increase tenfold for double the level of loudness, and this is the basis of decibels.

Ratio or Number	Power of 10	Common Log
1,000	10^{3}	3
100	10^{2}	2
10	10^{1}	1
1	10^{0}	0
0.1	10^{-1}	- 1
0.01	10^{-2}	- 2
0.001	10^{-3}	- 3

Table 1

Conversion to Decibels

Gain Ratio (+) Voltage	Gain Ratio (+) Power	dB	Loss Ratio (−) Power	Loss Ratio (−) Voltage
1.000	1.000	0	1.000	1.000
1.122	1.259	1	.794	.891
1.259	1.585	2	.631	.794
1.413	1.995	3	.501	.708
1.585	2.512	4	.398	.631
1.778	3.162	5	.316	.562
1.995	3.981	6	.251	.501
2.239	5.012	7	.200	.447
2.512	6.310	8	.159	.398
2.818	7.943	9	.126	.355
3.162	10.000	10	.100	.316
3.548	12.59	11	.0794	.282
3.981	15.85	12	.0631	.251
4.467	19.95	13	.0501	.224
5.012	25.12	14	.0398	.200
5.623	31.62	15	.0316	.178
6.310	39.81	16	.0251	.159
7.079	50.12	17	.0200	.141
7.943	63.10	18	.0159	.126
8.913	79.43	19	.0126	.112
10.000	100.00	20	.0100	.100
--	10^{3}	30	10^{-3}	--
10^{2}	10^{4}	40	10^{-4}	10^{-2}
--	10^{5}	50	10^{-5}	--
10^{3}	10^{6}	60	10^{-6}	10^{-3}
--	10^{7}	70	10^{-7}	--
10^{4}	10^{8}	80	10^{-8}	10^{-4}
--	10^{9}	90	10^{-9}	--
10^{5}	10^{10}	100	10^{-10}	10^{-5}

Table 2

Relative levels perceived by the ear thus could be expressed in exponential powers to a common base of 10, shown by indices. By disregarding the common base and expressing only the indices, the result is logarithms (a fancy word from the

Continued on page 22

AN RF POWER LINEAR USING IRF MOSFETS *from page 19*

oxide layer. All of the hexagonal source cells are then parallel connected by a continuous sheet of metalization which forms the source terminal.

Transistor action occurs by penetration of an electric field into the channel area which modulates the conductivity between drain and source. Conventional current flow is from the drain substrate, across the channel surface, and vertically out the source terminal. **ar**

MURPHY'S CORNER

On P28 of last month's issue, we suffered another attack of the 'anonymous author' syndrome! The undeserving victim was Graham Rogers VK6RO, author of the article "How To Use A Dummy Load (or 10 of them)". Perhaps readers would kindly correct our gross oversight by neatly inserting at the top of P28 - Graham Rogers VK6RO, 22 Grace St, Ferndale 6155. Sincere apologies to Graham.

Murphy seems to show a distinct leaning towards disrupting the writings of Lloyd Butler VK6BR! We trust that this is merely a statistical result, due to Lloyd being our most prolific Technical Author. Entire lines have been omitted from Lloyd's contribution in October AR, completely distorting the meaning.

Page 24, column 3, lines 6-8 should have read:

With the high SWR, higher current at current antinodes causes **increased IR loss and higher voltage at voltage antinodes causes** greater dielectric loss.

Page 25, column 1, lines 13-14 should have read:

Curve B of figure 13 **is a corrected curve for SWR at the transmitter versus matched** attenuation when the SWR at the load is lowered to 10. **ar**

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S-meter Reading	Induced Voltage	Gain dB
S-1	1 µV	0
S-2	2 µV	+ 6
S-3	4 µV	+ 12
S-4	8 µV	+ 18
S-5	16 µV	+ 24
S-6	32 µV	+ 30
S-7	64 µV	+ 36
S-8	128 µV	+ 42
S-9	256 µV	+ 48

S-Meter equivalent values

Latin for 'astrologer'). And that's all decibels are - a simpler and more practical way of stating powers (or logarithms).

Logs are no great mystery. At one time complicated tables were used to read log values, but these days an instant answer can be displayed on a pocket calculator. But in practice, neither of these aids is needed for decibels.

It's extremely easy. As Table 1 shows, $100 = 10^2$ and $1000 = 10^3$, and thus the log of 100 is 2 and that of 1000 is 3. If these figures were relative power levels, in any units, there would be a ratio of 1000:100 or 10:1. This could be written 10^1. And isn't that a Bel? Which of course is 10 dB. Simple! The log is the value in Bels, multiply by 10 and there's dB.

This could be expressed as a formula,

$$dB = 10 \log P2/P1.$$

In practice, calculations are much easier. Instead of deriving a ratio you could merely subtract the respective log values. Using the same figures, let's say you buy a 1 kW linear to beef up the 100 watt output of your rig. The respective logs are 3.0 and 2.0, with a difference of 1.0 by subtraction. Mentally shift the decimal point, and you have the same 10 dB again.

But, hold on, is this 1 kW of the linear the output power, or did the manufacturer quote the input to the final? H'mm. allowing for efficiency of the valve, typically 50% - 55%, that makes a difference. About 3 dB difference, which is subtracted to leave + 7 dB. But that's the order of gain from a 3-element yagi—oops! You've just found out you should have bought a beam instead!

Fine, the system obviously works with nice easy figures. But what about odd ratios, say a linear with 396.83 watts out for 97 1 watts in? Just as simple, for logs are 2 598 and 1 987, with .611 being the difference. No, the correct answer is not 6.11 dB gain, for round figures only are used. Fractions or decimals are useless, for as before the ear cannot detect increments of less than one decibel. The answer is plain + 6 dB.

Great! This time with a fourfold increase in power, your S-9 signals out are now S-9 and a shiver, and your S-2 signals are S-3 (decibels never lie). That beam still would be the better proposition - you'd also hear the weak ones stronger!

This now becomes even easier. As rounded figures alone are used, neither a book of logs and anti-logs nor an electronic calculator is needed, only a reference of ratios. A basic decade table with ratios from 1 to 10 alone would suffice - here for the purpose of explanation a second decade is added, plus multiples of 10 to 100. Intermediate values can be obtained by shifting the decimal point, for example, + 5 dB represents a power increase of 3.162 times, thus + 15 dB is 31.62 times. Similarly 316.2 times is + 25 dB, and so forth. Conveniently, the - dB values become the reciprocal of the + dB values.

In our pursuits, decibels are used mainly to indicate antenna gain or the attenuation of cables and insertion loss of various devices (all related to power). However, the conversion table also shows voltage ratios, for it is quicker and more convenient to measure voltage than power. But then both relative voltages must exist across a common resistance (whose value need not be known).

You recall that by Ohm's Law,

$$Pwr = E^2/R$$

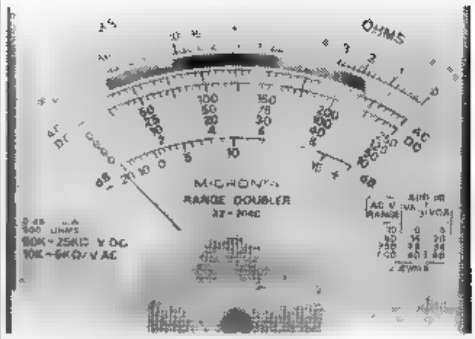
So, power is proportional to voltage squared (which is why the power ratios in the table are the square of the voltage ratios). And, to square any number, its logarithm is multiplied by 2. Thus the formula given before may be expressed also as:

$$dB = 20 \log V2/V1.$$

If input and output impedances differ, this will not be valid. Thus the voltage gain of an audio amplifier cannot be expressed in dB, only the power gain into a stated load, say a 8 ohm or 15 ohm speaker.

Now, decibels are a RATIO and not a definite value - you cannot put 2 dB in for 20 dB out, for whatever the input is, it always is referenced 0 dB. But if the input, or reference, is made a known standard in absolute units as 0 dB, the output likewise is known in absolute units as well as a ratio.

For this reason it is commonplace to use voltage comparisons with a varying input of speech (or music) in order to use an amplifier to its full capacity without distortion. This requires an established reference standard in absolute units.



dBm multimeter scale (bottom)

Several of these are employed in such professional fields as broadcasting and acoustics, when a further letter such as dBm or dBv denotes the reference used.

One often used was born with the telephone. The overhead wires, in pairs 10 inches apart, essentially were an open feedline with a characteristic impedance of 600 ohms. Then 6 milliwatts dissipated across this 600 ohms became 0 dB. Or, if you like, to itself it had a power ratio of unity or 1.

Now look at a multimeter, and there's a scale marked + 20 dB and - 20 dB either side of 0 dB. The zero point is well off-centre on the 10v scale at 1.9 volts. Which of course is the same 6 milliwatts across 600 ohms! For other values up to 100 dB, the higher voltage ranges are employed. So now you have a ready-made level or VU meter

Some multimeter scales are calibrated in the broadcasting dBm standard of 1 milliwatt dissipated across 600 ohms. This has its zero point at 0.775 volts on the 5v scale, which conveniently puts + 10 dBm almost centre-scale at 2.45 volts. Switch to the 50v range and the centre reading is + 30 dBm (add 20 to the reading). Or + 50 dBm on the 500v range (add 40).

And, while not calibrated as a VU meter, doesn't the meter on your rig do the same on transmit? The rig is 'talked up' to full output power!

As the S-meter on receive, it is calibrated for relative signal inputs. The reference standard is one microvolt at the antenna, which represents S-1 (as 0 dB) on the meter as determined by the agc voltage at the detector. Each incremental S-unit is + 6dB, for a progressive doubling of the input voltage induced in the antenna, right up to S-9 or 256 µV (+ 48 dB).

Old timers do not need these new-fangled gadgets, and accurately state signal strengths with the use of an unerring ear. Which is how all this started!

Decibels now should roll glibly off your tongue, even if you've not the foggiest notion of using common or Brigg's deci-

mal system of logarithms. But beware, there are other systems in Continental countries where natural or hyperbolic logs are preferred, expressed in Nepers. The calculations are no more difficult, for Nepers = .5 log P2/P1.

But again there's an easier way, for decibels may be converted into nepers and vice versa, as 1 neper equals 8.69 decibels. **ar**

WARC BANDS STILL NEW FRONTIER A DECADE LATER

More than 60 countries have already allowed their radio amateurs to use the so-called WARC bands of 30, 17, and 12 metres. These three HF bands were gained by the Amateur Radio Service at the World Administrative Radio Conference in 1979. However, it has taken the past decade for the various radio administrations to relocate other services from these bands.

The current sunspot cycle peak is providing significant opportunities for worldwide communications and experiments by radio amateurs on the WARC bands. Full call radio amateurs and shortwave listeners should find the 10 MHz, 18 MHz and 24 MHz bands, which sit conveniently between the conventional HF amateur bands, offer them new DX challenges. A beacon has been heard loud and strong on the 12 metre band. Using a frequency of 24.915 MHz it signs IK6BAK and gives its QTH locator JN63KR. This beacon will help you check propagation on the band, particularly towards Europe.

There have been a few initiatives to increase use of these bands including a special activity during the WIA's 75th Anniversary.

The WARC bands will also feature in the rules of some WIA 80 events over the next 12 months, because it is WIA policy to encourage greater use of these three bands.

Another stimulus for the 30 metre band has been the IARU Region 3 conference recommended packet band plan which gives that mode a place on the band. Another worthy initiative has been the re-broadcasting of the WIA Queensland Division news service on the 17 metre band.

Peter Brown VK4PJ transmits the re-broadcast on 18 120 MHz followed by a callback at 2330 UTC on Sundays He began this activity more than a year ago, and stations on the callbacks have been from all Australian states, New Zealand and near Pacific Islands Peter suggests that other WIA Divisions could give consideration to broadcasting on a WARC band. From his experiences, 17 metres is a good band for Australasian and Oceania contacts, without the QRM present on the traditional bands. **ar**

IBM LOG CHECK & SORTING PROGRAM

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It seems that the vast majority of computer programs that are published in Amateur Radio magazines are either Log,Contest or associated programs. This is no exception and I make no apologies as I feel this could be a useful utility to the growing number of IBM or compatible owners. This may be particularly so if you are interested in contests but prefer to use the age old process of pen and log book, or like me, feel your pen would be more reliable than the keyboard at contest speeds.

When I first saw the program that this log sorter was built around it was in the guise of a VZ200 contest program in Vol 4 Issue 8 1984 of the now defunct Micro 80 magazine and had been submitted by Ron Carson. On running the program, it became obvious to me that it had more use as a sorter and log check, though it could be used as an assistant to prevent doubling callsigns in a contest, if you felt that you could handle a keyboard and log papers at the same time. Having now not long acquired an IBM compatible and pensioned off the faithful old System 80, I started looking for some software to run in the new machine. Being basically lazy when it comes to the hard work of punching in a lot of software from the keyboard, and having a twelve year old boy who loves to get at the plastic brain for long periods of time, I found it quite easy to point Darren in the direction of the new toy armed with the simple program for the VZ and the challenge of 'see what you can do with this son!'

Darren soon found that the IBM was a little different from the VZ basic, but not to the point of being one for the too-hard basket, and he seemed to be enjoying the job of enhancing this program for the new machine. The final result has certainly seen the program change somewhat; it is more extensive and looks better on screen, but basically it still has the same functions as the original program.

If you, like me, have ever been in the RD contest and then at the end you have had to do a check log by long hand, you will realize the great benefits and time saving this program will offer. How I wished I had my VZ version with me in 1987 on Norfolk Island as VK9NP when it came time to clean up the RD log.

The program needs little explanation and is simplicity itself to run. You simply feed in your list of callsigns and let the audible tone and on-screen display tell you if you if you have a duplicate or not. There are five options to choose from the main menu: List - for an entry list to date; Sort - for an alpha-numeric sort of the list; Print - to send your list sorted or unsorted to the printer; End - to quit program; Enter - for your callsign entry's.

Throughout the program you will receive other options that will be self explanatory.

Good luck in the contest!!

G-LAND NOVICE LICENCE PROPOSAL

The Radio Society of Great Britain has proposed two Novice licences for Britain The RSGB said it had developed the proposal in response to a considerable decline in the number of new people joining the hobby and a demographic drift in the existing radio amateur population.

A suggested syllabus which includes basic operating standards and disciplines requires about 30 hours of study. HF bands would be available to those who passed a 5wpm morse code test, while a limited-Novice licensee would only have access to VHF/UHF/SHF bands.

Under the proposal Novices could use 160m, 80m, 30m, 15m, 10m, 6m, 70cm, 1.2GHz and 10cm. CW privileges are proposed on all bands, telephony on 160m, 10m, and all the higher bands except 6m which is reserved for data modes. An incentive to try out data modes and RTTY is provided on bands except 80m, 30m and 15m. SSTV and ATV is proposed for the new Novice licences on 1.2GHz and 10cm.

New Zealand third party traffice go ahead

After considerable debate within the local amateur radio fraternity, the New Zealand Radio Frequency Service (NZRFS) has given radio amateurs permission to handle third party traffic (TPT).

Some strongly resisted the move, claiming it was not in the best interests of the hobby, and called for TPT to be a restricted privilege However the NZRFS, after weighing up the arguments for and against, and in a climate of general deregulation in telecommunications, opted to give TPT privileges to all radio amateurs. At the same time, it announced that unqualified persons could speak over an amateur radio station under the supervision of the licensee. **ar**

```
1000 KEY OFF
1010 CLS
1020 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
1030 PRINT TAB(17);" ******************************************* ;"
1040 PRINT TAB(17);"; ******************************************; ;"
1050 PRINT TAB(17);"; ;                                          ; ;"
1060 PRINT TAB(17);"; ;   IBM or compatible contest log sorter   ; ;"
1070 PRINT TAB(17);"; ;     Rewritten   by   Darren   Connolly   ; ;"
1080 PRINT TAB(17);"; ;       PO BOX 104 TORONTO NSW 2283        ; ;"
1090 PRINT TAB(17);"; ;                                          ; ;"
1100 PRINT TAB(17);"; ****************************************** ;"
1110 PRINT TAB(17);"*********************************************"
1120 FOR A=1 TO 10000:NEXT A
1130 CLS
1140 CLEAR 2000
1150 DIM C1$(2000)
1160 CLS
1170 PRINT:PRINT:PRINT
1180 PRINT TAB(21);CHR$(201);STRING$(31,205);CHR$(187)
1190 GOSUB 2060
1200 PRINT TAB(21);CHR$(186);"   NEXT CALLSIGN, SEE BELOW    ";CHR$(186)
1210 GOSUB 2060
1220 PRINT TAB(21);CHR$(186);"  LIST  :- LIST WITHOUT SORT   ";CHR$(186)
1230 GOSUB 2060
1240 PRINT TAB(21);CHR$(186);"  SORT  :- SORT CALLSIGNS      ";CHR$(186)
1250 GOSUB 2060
1260 PRINT TAB(21);CHR$(186);"  PRINT :- LIST ON PRINTER     ";CHR$(186)
1270 GOSUB 2060
1280 PRINT TAB(21);CHR$(186);"  END   :- END PROGRAM         ";CHR$(186)
1290 GOSUB 2060
1300 PRINT TAB(21);CHR$(186);"        :- ENTER CALLSIGN      ";CHR$(186)
1310 GOSUB 2060
1320 PRINT TAB(21);CHR$(200);STRING$(31,205);CHR$(188)
1330 PRINT TAB(24);"   ENTER :- ";:INPUT A1$
1340 IF A1$="SORT" OR A1$="sort" THEN 1540
1350 IF A1$="LIST" OR A1$="list" THEN 1790
1360 IF A1$="END" OR A1$="end" THEN CLS:KEY ON:END
1370 IF A1$="PRINT" OR A1$="print" THEN 1970
1380 FOR I=1 TO LEN(A1$)
1390 NEXT I
1400 CLS
1410 FOR I=1 TO N
1420 IF A1$=C1$(I) THEN 1510
1430 NEXT I
1440 N=N+1
1450 C1$(N)=A1$
1460 PRINT:PRINT:PRINT TAB(21)" ";A1$;" IS NEW CALL SIGN"
1470 PRINT:PRINT:PRINT TAB(23)" ";N;" CALLS LOGGED "
1480 FOR X=1 TO 3000
1490 NEXT X
1500 GOTO 1160
1510 PRINT:PRINT:PRINT TAB(22)" ";A1$;" ALREADY LOGGED"
1520 SOUND 523.25,8.25:SOUND 0,3:SOUND 523.25,8.25
1530 GOTO 1470
1540 CLS:PRINT:PRINT TAB(30);"SORTING":PRINT
1550 FOR I=1 TO N
1560 A1$=C1$(I)
1570 PRINT"*";
1580 FOR J=I TO N
1590 IF A1$<=C1$(J) THEN 1630
1600 B1$=C1$(J)
1610 C1$(J)=A1$
1620 A1$=B1$
1630 NEXT J
1640 C1$(I)=A1$
1650 NEXT I
1660 PRINT:PRINT:PRINT TAB(27);"SORT COMPLETE"
1670 PRINT:PRINT:PRINT
1680 PRINT CHR$(201);STRING$(31,205);CHR$(187)
1690 PRINT CHR$(186);"     DO YOU WANT A PRINTOUT?    ";CHR$(186):PRINT CHR$(186)
;STRING$(31,32);CHR$(186)
1700 PRINT CHR$(186);" [PRINT] = PRINTOUT TO PRINTER ";CHR$(186)
1710 PRINT CHR$(186);"  [YES]  = PRINTOUT TO  YOU    ";CHR$(186)
1720 PRINT CHR$(186);"   [NO]  = RETURN TO MENU      ";CHR$(186)
1730 PRINT CHR$(200);STRING$(31,205);CHR$(188)
1740 I$=INKEY$:IF I$="" THEN 1740
1750 IF I$<>"Y" AND I$<>"y" AND I$<>"P" AND I$<>"p" AND I$<>"N" AND I$<>"n" THEN
 1740
1760 IF I$="N" OR I$="n" THEN 1160
1770 IF I$="P" OR I$="p" THEN 1970
1780 IF I$="Y" OR I$="y" THEN 1790
1790 PRINT
1800 CLS:PRINT:PRINT TAB(25);"CALL SIGNS LOGGED":PRINT
1810 FOR J=1 TO N+1
1820 PRINT C1$(J),
1830 NEXT J
1840 PRINT:PRINT TAB(18);CHR$(201);STRING$(29,205);CHR$(187)
1850 PRINT TAB(18);CHR$(186);" PRESS >>SPACE<< TO CONTINUE ";CHR$(186)
1860 PRINT TAB(18);CHR$(200);STRING$(29,205);CHR$(188)
1870 I$=INKEY$:IF I$<>" " THEN 1870
1880 GOTO 1890
1890 CLS:PRINT:PRINT:PRINT:PRINT"    DO YOU WISH TO CONTINUE?"
1900 PRINT:PRINT"          Y=YES     N=NO"
1910 PRINT:PRINT:PRINT:PRINT TAB(20);" ";N;" CALLS LOGGED "
1920 K$=INKEY$
1930 X$=INKEY$:IF X$="" THEN 1930
1940 IF X$="N" OR X$="n" THEN 2080
1950 IF X$="Y" OR X$="y" THEN 1160
1960 IF X$<>"Y" AND X$<>"y" AND X$<>"N" AND X$<>"n" THEN 1930
1970 LPRINT TAB(23);CHR$(201);STRING$(19,205);CHR$(187)
1980 LPRINT TAB(23);CHR$(186);" CALL SIGNS LOGGED ";CHR$(186)
1990 LPRINT TAB(23);CHR$(200);STRING$(19,205);CHR$(188)
2000 LPRINT
2010 FOR I=1 TO N+1
2020 LPRINT C1$(I),
2030 NEXT I
2040 GOTO 1040
2050 END
2060 PRINT TAB(21);CHR$(186);STRING$(31,32);CHR$(186)
2070 RETURN
2080 PRINT:PRINT:PRINT TAB(21);CHR$(201);STRING$(15,205);CHR$(187)
2090 PRINT TAB(21);CHR$(186);" ARE YOU SURE? ";CHR$(186)
2100 PRINT TAB(21);CHR$(186);"   << Y/N >>   ";CHR$(186)
2110 PRINT TAB(21);CHR$(200);STRING$(15,205);CHR$(188)
2120 B$=INKEY$
2130 IF B$="Y" OR B$="y" THEN CLS:END
2140 IF B$="N" OR B$="n" THEN 1160
2150 IF B$<>"N" AND B$<>"n" AND B$<>"Y" AND B$<>"y" THEN 2120
```

WIA NEWS *From page 5*

interference complaint.

Apparently some amateurs are under the mistaken impression that, if their station is established as the cause of the interference, whether it is their fault or not, the DoTC investigators will provide the radio amateur with a written report of the circumstances of the interference.

Current practice of the DoTC is to provide, on request, written advice to the **complainant** on a recommended course of action to rectify their interference problem

Therefore, under normal circumstances, a radio amateur will only receive a written report about an interference investigation by the DoTC, if the amateur is the complainant.

Visiting Canada?

The Canadian Radio Relay League (usually known as the CRRL), the WIA's sister society in Canada, recently advised the WIA that an Australian amateur had some problems obtaining his reciprocal Canadian licence because he applied to the Canadian Department of Communications head office in Ottawa, instead of to the appropriate regional office.

If you are visiting Canada, and wish to obtain a reciprocal amateur licence, you need to forward a copy of your operator's licence, your station licence and the details of your stay in Canada, to the appropriate regional office of the Canadian DoC, at least 3 months before your visit.

Visitors' reciprocal licences in Canada are free, so there is no need to send any money.

The Executive Office of the WIA has a list of the addresses of the regional offices of the Canadian DoC, and on receipt of a stamped, self addressed, envelope, we will forward a copy to members.

Incidentally, if you are travelling to Canada, or any other overseas country, don't forget to investigate using the amateur radio International Travel Host Exchange program. It could make your visit that much more interesting.

Listen for Microsats

From the American Radio Relay League (commonly known as the ARRL, the sister society to the WIA in the United States of America) comes news that, on November 10th, 1989, from the spaceport of the European Space Agency located near the equator in French Guiana, an Ariane IV rocket is scheduled to carry 6 amateur radio satellites into orbit.

Four of these satellites have been dubbed MicroSats because of their unusually small cubed-shaped size measuring only 9 inches on a side

These tiny satellites, in comparison to the large military and commercial satellites normally flown today, represent the ultimate in small, low cost, highly efficient spacecraft design.

The design and construction of these MicroSats has been co-ordinated and organised by the Radio Amateur Satellite Corporation (normally known as AMSAT), in collaboration with the ARRL, and the Tucson Area Packet Radio Association.

Although OSCAR satellites, such as OSCAR-13 which was successfully placed in orbit last year, have been getting heavier and larger, these new MicroSats represent a radical departure in philosophy.

Because of the dearth of launch opportunities caused by the Challenger shuttle accident over 3 years ago, AMSAT now has to pay the full cost for launches which, until recently, were provided essentially free of charge. Because of the competition from commercial satellite users to find space on launch vehicles, AMSAT has found it necessary to change to a small satellite design which requires only modest launch support services, and can fit into places on the launch vehicle normally reserved for lead ballast.

While large aerospace companies employ thousands of engineers and technicians, supercomputers, and command almost unlimited budgets, AMSAT and the amateur radio service have again proved that they have the initiative and ingenuity to stay at the leading edge of electronics design and construction on a shoe-string budget.

USA Codeless Licence

The Australian amateur service morse-code-free licence, the Limited Licence, was introduced in the mid-1950's. There was the usual hue and cry from those who saw it as the end of amateur radio but, as we all know, they were wrong (why is it that the small minority of people who are the most resistant to change always seem to be the most vocal?).

This innovative approach to amateur service licensing introduced a whole new group of people to our leisure time hobby, to the extent that Limited Licensees now make up almost 20% of Australian radio amateurs.

Considering that we have had the code-free licence in this country for over 30 years, it has been rather interesting to read the many conflicting editorials and "letters to the editor" appearing in the amateur radio press in the USA over the past few months about the question of whether to seek a code-free licence for that country's amateur service or not.

The latest newsletter to hand from the ARRL advises that the ARRL finally petitioned their licencing authority, the FCC, on 31st August 1989 for a new "Communicator" code-free licence class

Of further interest is that the ARRL only requested this licence for use on amateur frequencies above the USA 220 MHz band

Keep the WIA Going

In keeping with the majority of similar volunteer and membership organisations in Australia, the WIA is having difficulty in finding enough suitably qualified volunteers to perform all of the administrative and other tasks needed to keep the organisation going

Just one example, for instance, is that the majority of Divisions do not even have enough volunteers to fill all the vacancies on their Divisional Council..

Amongst other things, this means that more and more work is falling on the shoulders of the few, and that not only is some of the work needed "falling off the edge", but these hard working volunteers are beginning to suffer from "volunteer burn out".

Unfortunately, the Federal Treasurer, Kathy Gluyas, VK3XBA, has been forced to resign from Executive because of ill health, and the Melbourne based Executive are now suffering from the same problem as the Divisions

Executive are very much in need of two additional, Melbourne based, members. It is not so much the amount of work needed from these two additional members (it should only amount to about the equivalent of two evenings per month), but the administrative, managerial, and financial skills that are important

If you live in, or near Melbourne, have these skills and experience, and would like to make a worthwhile contribution to the future of amateur radio, Executive is anxious to hear from you. **ar**

THEY SAY IT NEVER STRIKES TWICE IN THE SAME PLACE

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Benjamin Franklin's Kite

They say it (lightning, that is) never strikes twice in the same place. They also say that the reason is that after the place is struck, it isn't the same place any more. This is an account of my own, personal lightning strike, but before giving you the messy details, I would like to share with you information I have gleaned on the subject from articles in the July 1975 and November 1988 Scientific American. This information may be old to many readers, but may be new to some, as it was to the writer.

Ever since Benjamin Franklin flew a kite in a thunderstorm and proved to his own and others' satisfaction that lightning is an electrical discharge, the phenomenon has been the subject of many investigations, but its exact origins and the mechanism by which rain clouds become electrified are still not completely understood. Please do not attempt to reproduce Nutty Benny's experiment, as it is extremely dangerous, and he was lucky to have survived to establish and edit the "Saturday Evening Post.'

Static Electricity is Anything But

We do know that lightning is the transfer of electric charges from one region of a cloud to another, or between a cloud and the earth. How are these charges developed? We don't have a complete answer. Commonplace articles have equal numbers of positive and negative charges distributed evenly over them, and are electrically neutral. The distribution can be altered, and the object is then said to be "electrified" or carry a static electrical charge. The degree of charge is measured in volts

The place where I work (a hospital) has carpets, and is air conditioned When the air is dry, my shoes alter the charge distribution between me and my surroundings, sometimes by as much as 100,000 volts. I sometimes inadvertently and painfully re-establish equilibrium by grasping a doorknob. In the days of ether anaesthesia, this effect was nothing to joke about. Ether vapour is highly inflammable, and a nurse's nylon underwear could lead to an exploding patient. If you too are troubled by such sparking, forgo nylon underwear, or carry a bunch of keys or a pen to discharge yourself.

Can Electrons Cause a Strike (Industrial)?

Some years ago, this problem led to industrial unrest through complaints from the Sydney Harbour Bridge toll collectors, who got zapped regularly by motorists whose car tyres on the bitumen built up a charge. Some of you may recall the wires which were installed in the road surface to discharge the cars as they approached the collection booths. They are not there anymore. Perhaps modern motor tyres are now conductive, or perhaps the current toll collectors are hardier specimens. Some car owners attach to the vehicle's chassis a rubber strip, which drags along the ground. You have probably seen them. Maybe you have one yourself. These are believed to bleed off any static charge, and reduce thereby the likelihood of car sickness. In view of the total absence of a scientific basis for this belief, the only beneficiaries may be the sellers of the strips.

Can Electrons Cause a Strike (Electrical)?

A human on a carpet pales into insignificance against a typical lightning bolt, which represents a potential difference of several hundred million volts, and transfers perhaps 10 coulombs (or around 10^{20} electrons) in a very short time. That is a lot of amperes. Your average storm cloud, producing several flashes per minute is putting out a few hundred megawatts.

There are two basic hypotheses which have been advanced to explain how all this charge separation takes place: i) the precipitation theory, and ii) the convection theory.

In the precipitation theory, large raindrops, small ice crystals and hailstones fall under gravity past a mist of smaller, suspended raindrops. The falling particles become negatively charged and leave matching positive charges behind. Thus, the base of the cloud becomes negative, and the body and top positive.

In the convection hypothesis, warm air currents rising in the cloud carry positive charges from the ground and up through the cloud. Negative charges from cosmic rays and such are attracted to the cloud surface by the positive charges within it, and form a "screening layer." Downdrafts carry negative charges to the base of the cloud. Updrafts do the opposite, the effect being similar to a van der Graaf generator.

In both theories, the end result is a massive dipole. However, the precipitation model requires no convection, and the convection model no precipitation. Which one is correct? Are they both correct?

The answer, according to the Scientific American, is an ambivalent "yes" and "no". A thundercloud is apparently not dipolar but tripolar, with a main, negatively charged area sandwiched between two positively charged regions, something like a very simple capacitor, and surrounded by a negative "shield".

In a big, fat, healthy cumulonimbus, (the "cunim" much feared by pilots), the main negative charge is about six kilometres high, only a few hundred metres thick, and at a temperature of about minus 15 degrees Celsius The upper positive region can extend to the tropopause, at a height of about 13 kilometres and a temperature at the top of about minus 65 degrees Celsius. Your average pilot can't fly over that! The base of the cloud has a smaller positive charge layer about three kilometres thick, and a temperature of about plus 10 degrees

Celsius at the base.

It is now believed that the likely explanation for charge distribution in thunderclouds is the interaction between "graupel" particles and ice crystals. What are these "graupel" particles, I hear you ask. They are, apparently, millimetre-sized ice particles which are larger than ice crystals, from which they strip charges at the critical temperature of about minus 15 degrees Celsius, which, you may recall, is the temperature around the middle of a thundercloud. Feel free to win a few extra points with "graupel" in your next "Scrabble" game.

But even this picture is oversimplified, because a thundercloud has a life cycle, and builds up and decays, with violent updrafts and downdrafts. There are charged chunks of cloud going up and down like demented elevator operators. This leads to great instability between charges, and so we have lightning.

The Massive Discharge

Once the electric field between charges exceeds the dielectric strength of the intervening atmosphere, say around a million volts per metre, you have lightning. In less than a second, maybe 10^{20} electrons go from here to there, the electrical power being equivalent to 100 million of your average light bulbs. The energy appears as light, radio waves (that pesky QRN), sound waves (thunder) and heat.

Cloud to Cloud

Most of the discharges occur within the cloud, and we don't get to see them, except perhaps as bursts of diffuse light. A double ended branch or "tree" invades the negative and positive regions. These don't bother anyone except nervous creatures, such as my dog, who goes to the smallest, darkest place in the house, and, of course, foolish pilots in a hurry to get home.

Cloud to Ground

In a cloud-to-ground discharge, the negative end of the "tree" becomes a "stepped leader" carrying a few hundred amperes in the direction of down. At about 100 metres from the ground, there is a return stroke, which transfers a 10 kiloampere current (10,000 coulombs of positive charge) upwards. This is what you see (or perhaps you don't see, if you are standing in the wrong spot) as a lightning flash. For a copper conductor to carry this current safely, it would have to be a quite heavy gauge, (like about 20 square centimeters in cross section area), and would cost a lot.

The stepped leader may take 20 milliseconds to move downwards, but the return stroke is over in about 20 microseconds. This may be the end of it, but more commonly, the current pathway created allows repetitions of the process, at 10 to 100 millisecond intervals, several to many times. The electrical energy involved is enough to light up those 100 million ordinary light bulbs. But only part of it appears as light. Some appears as radio waves (QRN) and some as heat. The heating of the air in the path of the discharge channel causes the oxygen and nitrogen to expand rapidly and produce acoustic energy, as thunder. The heat can be up to 30,000 degrees Celsius, and the pressure from 10 to 100 atmospheres. For complex reasons, explained in the Scientific American article, but not understood by the writer, the more powerful the lightning stroke, the lower the frequency of sound of the thunder, typically around 60 Hz. The energy also causes the production of ozone and nitrogen oxides.

Sight and Sound

You, as the observer, see the lightning strike, then, if you are lucky and are not the person on the spot, as it were, there will be a perceptible pause, and you will then hear the thunder. Now sound travels at around 700 miles per hour at sea level, or, if you are metricated, about 1100 kilometres per hour. But light travels at, let us say, lightning speed, and at the short distances we are considering, you see the flash almost when it occurred. So if you now count the number of seconds which elapse between seeing the flash and hearing the thunder, and divide by five, the result will be the distance in miles between you and the event. For the younger reader attuned to the metric system, you should divide by three to get the distance in kilometres.

Please note that this figure is the distance between you and the event, and not distance as the crow flies, (or would fly if it wasn't raining). The discharge may well be five to ten kilometres above you, up there near the troposphere. But it is a useful trick, which you can use to determine whether an electrical storm is approaching, departing or staying put, and to impress friends and bystanders.

Complications

But once again, this is an oversimplification. For a strike going straight to ground, the counting system works fine. But a discharge in the clouds can travel several kilometres, across your field of vision, or away or towards you, and at any horizontal or vertical angle. Counting to the first sound of the thunderclap after the flash will tell you where the discharge started. It is the direction it then takes in relation to your location that dictates what you hear subsequently.

If you hear a single sound, a "clap" of thunder, it is probably a single ground strike. If you hear a "roll" of thunder, it is probably a long, intracloud discharge. Time the duration of the roll in seconds, and apply the above formula. This will give you the minimum length of the discharge, which may take a tortuous path through the cloud, usually at a fairly constant height of about five kilometres. Then, of course, you could have a combination of both a cloud and ground discharge, and hear claps and rolls worthy of the 1812 Overture. It is all really quite complicated.

More Complications

It gets more complicated. The attenuation of a sound increases as the square of its frequency, so at a distance you are more likely to hear the big discharges, and they will be low in pitch, or even felt only as vibrations. Then there is the effect of air temperature gadients and winds. These can deflect the sound so that it fails to reach you, or refract it so that it passes over your head, even though the discharge is quite close. The maximum range for hearing thunder may be as little as ten kilometres, but under favourable conditions it may be much more. It is something like tropospheric ducting of radio waves.

An Everyday Occurrence

There are thousands of electrical storms taking place on the earth at any given time. Some are quite small, with five or so discharges taking place per minute. In the big ones, however, there may be 100 or more per minute, and there is a lot of electricity reaching the ground. Why then does not everyone's hair stand on end, like those van der Graaf generator demonstrations where the operator looks like Yahoo Serious?

According to the Scientific American, there is a nearly constant potential dif-

ference of 300,00 volts between the negatively charged earth and the upper atmosphere. They say there is a "fair weather" leakage current of about 2,000 amperes which would eliminate this potential difference if thunderstorms, mainly in the tropics, did not balance this current. The writer does not understand the significance of this phenomenon, but perhaps a reader or two out there does. In any event, everything is going to be alright, and you should not worry if you haven't experienced a thunderstorm recently.

The Benefits

Thunderstorms do us a lot of good too. They are certainly fun to look at, can be quite exciting and make one of the loudest of nature's noises. Their electrical activity also fixes a lot of atmospheric nitrogen, which falls to earth in rain and fertilises our soils. So the next time you see one, you can marvel at its complexity, stand in awe of the massive energy it releases, and reflect that we still do not fully understand how it works. One thing we can understand, however, is how much damage a lightning strike can cause. One only has to look.

The Effects

The physics of a thunderstorm may appeal only to the technically inclined reader. But the following case history should be of interest to any ham who has an antenna.

It was the night of Friday, 9th of December, 1988, and it was raining. In fact, it was raining very hard, as it is wont to do in the writer's home QTH, Turramurra 2074, a suburb with one of the largest annual rainfalls in Sydney. It is also one of the highest, a fact of which your writer was prior to this date, blissfully unaware

The property boasts many trees, one of which is a very tall gum tree (eucalyptus citriodora) of extreme beauty and grandeur, and, incidentally, ideal as the mounting point for one end of a G5RV dipole. It was used for this purpose, the OM being at the time happily ignorant of the fact that the land height plus the tree height meant close proximity of the antenna to any clouds that might pass overhead. The antenna farm is completed by a TH3 Junior, mounted on a disused chimney in the corner of the shack, and a home brew triband spider quad.

The Calm Before The Storm

On the evening of December 9, 1989, the OM and XYL were settled in their chairs in peaceful domesticity, watching television. The rain was pouring down, the rain gauge recording 55 mm for the relevant 24 hour period. But this was no big deal for Turramurra folks. Nine months earlier in April, we had a 24 hour reading of 155 mm, so this was your average rainfall, and we were unperturbed. At around 8 pm the sound of distant thunder was heard, and lightning flashes could be seen through the curtains. Rainwater gushed over the flooded roof gutters.

Now the XYL has a thing about the big tree. In the way of ladies who have raised six harmonics into adulthood, and aware of problems you and I perceive but dimly, she expressed her doubts about the security of the tree, which she is convinced will eventually blow over in a storm and demolish the "West Wing". The OM pooh poohed this 'negative' thinking, but nevertheless was sufficiently concerned to count, (surreptitiously), the seconds between flash and bang in the approved fashion (see above). The counts started at 20, then shortened to 15, then 10. The flashes were by then annoyingly bright, and the thunder oppressively loud. The sounds of ambulance, fire engine and police sirens could be heard all around. Then all the lights went out.

The Blackout

A quick check of the neighbours' houses indicated that it was a general power failure, probably from a power surge tripping something somewhere in the power grid, or, as I unthinkingly remarked, because of a fallen tree. By the time the emergency torches were located, (and the flat batteries replaced), the power was restored. Good old Electricity Supply, on the job as usual. The rain continued to fall, and the roof gutters continued to gush.

By this time the lightning was getting to be quite impressive, and the dog, up to this point attempting to insinuate her head between chair and occupant, was now attempting to climb on to our laps, and she weighs 45 kilograms! We continued to watch television, but the XYL looked pale, and was not giving the show her full concentration. The rain then eased to a mere downpour, and the sounds of thunder abated as the storm passed overhead and moved off towards Palm Beach. The XYL uncurled her clenched fists, and the dog opened her eyes.

The Strike

Then it happened. There was a monumental thunderclap, the house shook to its foundations, all the lights went out and there was the sound of breaking glass. The XYL uttered a most uncharacteristic expletive which had hitherto never passed her lips. The OM improved considerably on her performance. We both realised that we had suffered a direct strike. A quick look out the window revealed the neighbours snug in their well lit homes. This was no mere power failure, this was a more serious occurrence. OM and XYL then checked the tree. Yes, it was still upright, no problem there. Then, against the forcefully expressed advice of the XYL, the OM went to the fuseboard to see whether the core balance had tripped. Happy days, let us reset it. Lo, the lights come one - but only some lights.

Ever the optimist, the OM then removed and repaired blown fuses in sequence, in an attempt at damage control. Repairing them restored power on two of our three phases. The third phase was out, and Murphy's Law dictated that our refrigerator and freezer were on that phase. So was the television set, but it was a dull program we were watching anyway, so we went to bed. On the way we noticed on the floor a small piece of plastic, which we could not identify.

Inspection For Damage

The following day was sunny and clear, and OM and XYL were up early assessing damage. There didn't seem to be anything out of the ordinary. The tree was fine, the quad and the TH3 were fine, but where was the G5RV? One half of it was on the ground, undamaged. The other half had disappeared from the face of the earth. So had the ladder line. Plastic separators and shreds of plastic were all that remained. The central and end insulators were 30 metres away The heavy coiled spring used as a shock absorber against tree movement was a shrivelled remnant of its former self.

There was a large chunk of concrete blasted out of the carport, and a long mud splash on the wall of the house. One car hubcap was lying beside its wheel. One windscreen washer jet was missing, and found later several metres away We agreed that this must be where the lightning went to ground. Unfortunately, this was only partly correct.

The Extent of the Damage

The breaking glass heard the night before was found to be an outside light, blasted from its housing by the shock wave The black plastic (see above) was now identified as the remains of the small transformer used to power the receiver cradle of the cordless telephone. Never mind, we still have an old fashioned dial telephone. Call the electrician. He arrived within the hour, and quickly discovered a blown council fuse. Aha, so one phase was out! Curiously, none of the house wiring was damaged. Clever tricks behind the fuseboard got our refrigerator and freezer back in operation, but the fuse was a job for the County Council. They were rather busy, as we were not the only victims of the night's 'acts of God'. It took more than an hour of "all our lines are busy, but you are in a queue . . . " before the service call was arranged. You've been there, heard that.

But the real extent of the damage revealed itself gradually, like the sun rising. Downstairs there was a funny swishing noise. It seems to be coming from under the house. Why is there a foot of water here? The rain wasn't that heavy. Dear reader, there was a hole in the copper water pipe running under the floor. A visit to the laundry then revealed a pile of wet clothes which were dry the previous night. A fine spay is coming from a ventilator. Here is another hole in the copper water pipe. Upstairs to call the plumber, who also arrived within the hour. We now have two tradesmen working. Then we found a third hole in the plumbing.

Who turned off the Christmas tree lights? No one. All the tiny little bulbs had blown. Check the television set. Nothing. Is it perhaps the video recorder? Yes, it is. The video recorder has gallantly protected the television set from damage by blowing up beyond repair.

Now it is time to go shopping in the other car. Actuate the garage door opener. Nothing The receiver board has blown. Never mind, do it by hand Come back from shopping Do some washing. Not possible, machine timer inoperative, (but we jibbed at doing the washing by hand).

Then a final thought at the end of an eventful, fun-packed and exciting day - what of the equipment in the shack? The Kenwood 520 (on the TH3) is fine, no problems. The Kenwood 820, through the antenna tuner (with the quad and G5RV) is not very well. Burned contacts in the tuner, and no HV in the transceiver.

Apart from the above, damage caused by our lightning strike was slight.

The Current Pathway

Reconstructing events, the strike hit the G5RV, and part of the charge went down the tree trunk, carport supports and then to ground via an old dynabolt in the concrete. The remainder of the electrons raced along the antenna and ladderline, vaporising the copper, but leaving the plastic undamaged, then entered the electrical wiring in the roof. Some of the electrons went to the fusebox and blew one main fuse and nearly all the house fuses. The core balance transformer was undamaged, and probably tripped in time. The remainder surged along the metal conduits (it's an old house) and went to ground wherever they fancied. They especially fancied the copper water pipes, and when they did, punched neat holes to let the water out. The other antennas were spared, as they were both, by their design, connected one way or another to excellent grounds.

A Daily Event

The writer is not unfamiliar with lightning, having lived in Malaysia for three years, where lightning is practically a daily event during the two monsoon seasons. But there, they manage things better. All well constructed houses have lightning protection in the form of a broad copper strip (inch by quarter inch) along the roof top, with three or four sharpened copper spikes protruding. These are not there to conduct a strike to ground, though they may do so on occasion. What they really do is leak madly from the tips of the spikes when a charged thundercloud is overhead, and reduce the electrical potential between ground and cloud, hopefully to below the breakdown voltage of the intervening air. In retrospect, this is a precaution which Turramurrians and others on the high ground could well consider.

Tales to Tell

The author has now dined out on this story many times since the event, and found to his amazement, that others had similar tales to tell. One even described how he was actually struck by lightning and suffered no more than singed hair. It wouldn't have happened in Malaysia, where the lightning bolts are of considerably heavier gauge. It kills around one person a month there.

Insurance, Don't Have a House Without It!

There is a happy ending, of sorts. Insurance covered all the damage, but the assessor, a very businesslike lady, wanted to see the evidence, of which was an abundance. It is indeed "great to know that you're covered by GIO."

Precautions

What does one do when a very dark cloud is approaching? Well, if you are playing golf, head for the clubhouse via the lowest ground available, and consider leaving the clubs behind. Keep away from high ground, all tall trees or structures and conductors like railings and wire fences. If you are at home, stay indoors and do not use the telephone. In the shack, some recommend disconnecting all antenna leads, which is probably a wise precaution. One ham suggests covering the antenna connector with a plastic bag and pushing the lead out the window, but this might be a bit extreme.

A Sacrificial Dipole

Let me close on a humorous note. The XYL has been inclined to complain about the three amateur radio antennas and the TV antenna. She says the place looks like Pine Gap, but without the protesters and the CIA. The similarity will be enhanced when I put up the dish.

But she has modified her attitude somewhat since the event, however, following a harmonic's analysis of the situation. He suggested that without the G5RV on the tree, the strike may well have blasted the trunk, and really demolished the "West Wing", and ventured the opinion that the antenna could be termed a "sacrificial dipole". The tree now carries a replacement G5RV, with her enthusiastic approval.

However, it has been placed a lot higher up. ar

Have you advised DoTC of your new address?

AN INTRODUCTION TO SYNCHRO TORQUE TRANSMITTERS AND INDICATORS

(Selsyns to you and me) Part Two

DEAN PROBERT VK5LB
RMD VERRALL ROAD HOPE FOREST 5172

Introduction

In this second Part the author intends to detail how to set up a pair of synchro torque indicators for quiet efficient operation, how to identify which selsyn you have and what its operating parameters are as far as available information will permit. Many of these units were manufactured during the war and so data on all of them is not available.

Selsyn Types

Transmitters fall into five main groups which concern those wishing to use them for beam indication.

Selsyns have certain information stamped on their cases ie Frequency c/s 50, 60 or 400. (c/s=cycles/second), Voltage ratings 50/50, 110/50, 115/90 (Rotor/stator). These values will be stamped on the case of the unit ie 50v 50 Serial numbers are, Muirhead type No E-10-A/1 or British Services Number 6549A.

It will have either Transmitter or Indicator (or Receiver) together with a Mk11 or Mk111 stamping on it. Also there should be the manufacturer's name, Muirhead or GEC etc.

The 400 c/s units were developed for aircraft use and are much lighter and have fewer windings in the laminations. They will work on 50v 50c/s but not as well. They tend to be a little sluggish compared with the 50v 50c/s units but still do the job.

Whatever selsyn you intend to use will be up to you. The information to look for is Transmitter or Indicator If it is not one of these it is probably unsuitable.

Transmitters

These fall into the following categories.

Synchronous Link Transmitters
Transmitters
Coincidence Transmitters
Follow-through Transmitters
X-Co Transmitters

Indicators

Receivers are suitable for pointer indication only due to the amount of torque they develop. Most are 50v 50c/s such as the E-10-A/1 unit. The E-10-A/2 is a 115v 60c/s unit. It probably will work OK on 50v 50c/s. Regardless of the serial numbers, the word Receiver or Indicator is what you should look for. Remember from Part One that Transmitters will work with Transmitters so it is not essential that you obtain an Indicator/Transmitter set.

Transmitters are usually manufactured with 3" diameter cases and Indicators usually with 2" cases as a guide.

Other Types

(Not suitable for indication purposes.)

The other selsyns are:-

Hunters Generally these only have a partial movement such as that used in turning on and off a switch or hydraulic valve mechanically.

It has a serial number similar to E-25-A/1 and is usually in a 3" case. Its correct name is a torque differential Receiver. It has markings on the back of the case of 1,2,3 and 1,2,3 with distant and local stamped on the back.

Resolvers: Have at least two separate stator windings (not connected) and two rotor windings. Serial number E-64-B/1 or E-64-C/1 with 1R,2R,3R and 1T,2T,3T stamped on the back.

Linvars: Are characterised by having only one winding on the stator and one on the rotor. They are correctly called a linear Variometer and have markings on the back on 1,2 and X,Y only. Serial numbers are E-8-D/1 or E-8-D/2 etc.

Servo Induction Motors. They have 3 phase 2 pole star connected windings internally and are motors. They have a no-load speed of 2,800 rpm. Serial numbers are E-16-A/1, or similar, and have an X,Y and 1,2 marking on the back

Hysteresis Motor. Again a motor which revs at 3000 rpm. It operates on 240v 50c/s 3 phase and has 1,2,3, stamped on the back. Serial Number E-49-E/1 etc.

Split Field DC Motors. This one revs at 7000 rpm, is a DC Servo Motor and has the markings A,A and F1,F2 on the back. Serial Numbers are similar to E-52-A/1

Induction Generators. Supply is 50v 50c/s at 1000 rpm. It has 2 phased windings spaced 90 degrees. Serial Number is similar to E-5-A/1 and has 1,2 and X,Y stamped on the back.

Two Pole Permanent Magnet Alternators. They have two phases in quadrature; each 7.5v 25c/s at 1500 rpm. Serial numbers are similar to E-28-B/1 and has numbers 1,2 and X,Y stamped on the back.

As you can see, unless it has an X,Y and 1,2,3 stamped on the back it will not be suitable for indication purposes. There is an exception the author is aware of however

Transmitter Magslips

Suitable transmitters fall into two categories: Control Magslips and Torque Magslips

The control transmitters are generally used in conjunction with a Transmitter and a Receiver making up a three unit system. The control unit corrects differences between the headings of the Transmitter and Receiver It is also used as a stand alone Transmitter They take the following forms, with 3" cases.

50c/s Transmitter, E-17-A/1
Coincidence Transmitter, E-20-A/1.
Transmitter (for FT supply), E-22-A/1.
Follow Through Transmitter, E-

THE GEORGE BUSH, MA
MIKHAIL GORBACHE

What has made Icom's range of transceivers world leaders in their class? Could it be the uncompromising standards of a George Bush? Is it the durability of a Maggie (Iron Lady) Thatcher? Or the innovative thinking of a Mikhail Gorbachev?

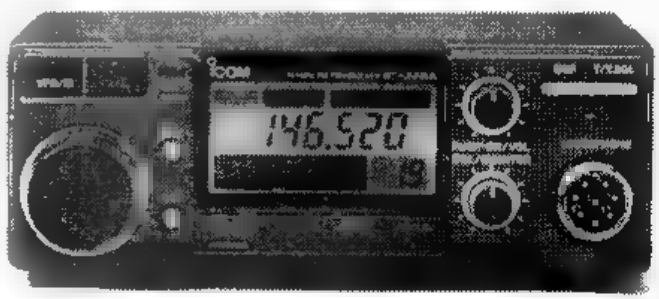
It is, in fact, a combination of all three.

Which has led millions of radio users around the world to choose Icom. Their vote has made Icom the world leader of transceivers

The Icom IC-725 HF mobile 500KHz-30MHz transceiver is complete with DDS synthesiser, 26 memories (two memories for duplex frequencies), switchable pre-amplifier, scanning, CI-V system for PC control, built in antenna tuner controller and band stacking register

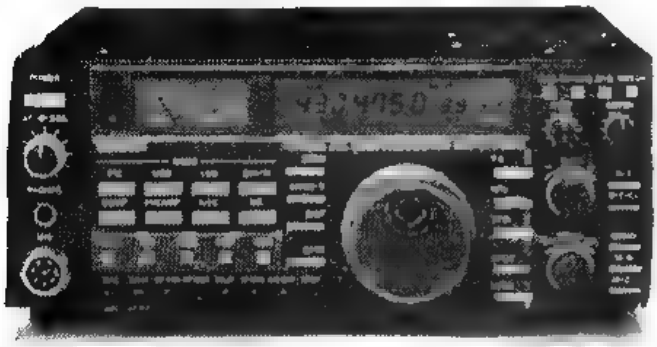
The Icom IC-765 HF transceiver features DDS synthesiser, high speed auto tuner, built in AC power supply, 99 programmable memories, keyboard frequency entry, band stacking register, general coverage receiver 100KHz-30MHz, CI-V system for PC control and rack mounting dimensions.

The Icom IC-32AT dual band FM transceiver outputs 5.5W and has a full duplex crossband operation, on/off switchable power saver and 20 double-spaced memory channels that can store two frequencies. The programmed scan function scans all frequencies between two programmable frequencies. And Priority Watch monitors the Call Channel, a memory channel or all the memory channels in succession, every five seconds.



The Icom IC-228A (25W) and IC-228H (45W) mobile FM 144MHz transceivers are compact and easy to operate with 20 memory channels, multi-colour LCD programmed and memory scans, variable tuning steps, priority watch main controls lit for night operation.

RGARET THATCHER AND V OF TRANSCEIVERS.



The Icom IC-475A (25W) and IC-475H (75W) 430 MHz All Mode transceivers are designed for packet mode with direct digital synthesizer (DDS), 99 memory channels, USB, LSB, CW, FM, passband tuning and adjustable IF notch filter.

The Icom IC-575A (10W) and IC-575H (100W) 28/50 MHz All Mode transceivers have a receiver coverage of 26-56 MHz and are equipped with direct digital synthesizer (DDS), 99 memory channels, and passband tuning

The UHF FM Icom IC-4 GAT with 6 watt output has digital touch step for frequency selection, programmable call channel, LCD readout, optional pager function, programmed and memory scans, automatic power save and 20 memory channels

The Icom IC-275A (25W) and IC-275H (100W) All Mode 144MHz transceivers are designed for packet mode and feature direct digital synthesizer (DDS), 99 memory channels, USB, LSB, CW, FM, and passband tuning.

The palm size Icom-2SA, 144 MHz FM transceiver has 5 watts output with optional BP-85, 48 memory channels and an automatic power saver, LCD readout, operation from battery or external 12V DC supply A PTT lockout switch is provided to prevent accidental transmissions Options include: paging, code squelch functions and beep tone on/off control

Call Melbourne on (03) 529 7582 or interstate on (008) 338 915 for your nearest Icom stockist. ICOM

ICO 0047

21-A/1

60c/s Transmitter, E-17-N/1.
Coincidence Transmitter, E-20-C/1.
Follow Through Transmitter, E-21-D/1.

400c/s Transmitter, E-17-N/2.
Coincidence Transmitter, E-20-C/2
Follow Through Transmitter, E-21-D/2

The 2" case Control Magslips take the following forms but are less common.

50c/s Transmitter, E-1-A/1.
Coincidence Transmitter, E-3-A/1.
Follow Through Transmitter, E-4-A/1.

60c/s Transmitter, E-1-J/1.
Coincidence Transmitter, E-3-D/1.
Follow Through Transmitter, E-4-D/1.

400c/s Transmitter, E-1-J/2.
Coincidence Transmitter, E-3-D/2.
Follow Through Tranamitter, E-4-D/2.

The Torque Transmitters take slightly different forms. The 3" case types are characterised by,

50c/s E-18-A/1, E-18-D/1, E-18-C/1.
50c/s High Torque E-19-B/1, E-19-H/1, E-19-F/1, E-19-N/3.
60c/s E-18-H/1.

400c/s E-18-M/1, E-18-D/2.

The 2" case Torque Magslips are,

50c/s E-2-J/1, E-2-H/1, E-2-B/1, E-2-K/1.
60c/s E-2-B/4, E-2-K/3.

400c/s E-2-J/2, E-2-H/2, E-2-B/3, E-2-K/2.

Transmitter Marking Exceptions

As mentioned earlier there are some exceptions to the X,Y and 1,2,3, rule. The following chart shows them clearly.

Type	Rotor			Stator		
	A	B	C	D	E	F
E-17-A/1, E-17-N/1, E-17-N/2, E-22-A/1	-	Y	X	1	2	3
E-20-A/1	-	2	1	X	Y	Z
E-20-C/1, E-20-C/2	-	SY	SX	1	2	3
E-21-A/1, E-21-D/1, E-21-D/2	1R	2R	3R	1T	2T	3T

Figure 1 Terminal Designation

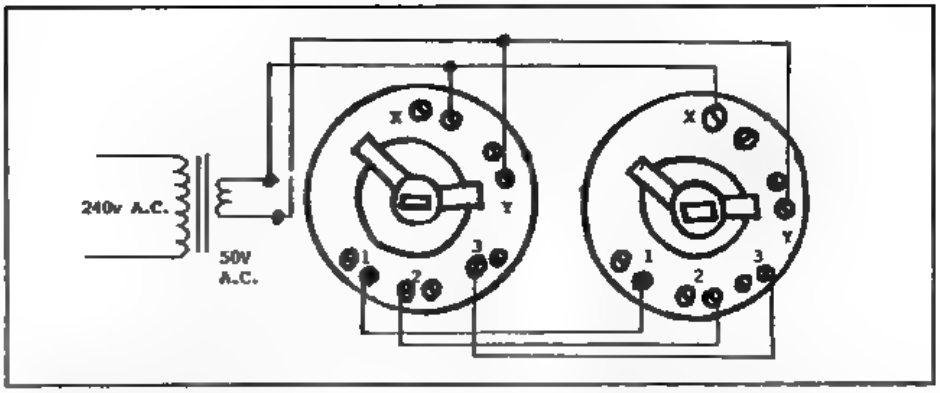


Figure 2 Indicators

Receivers have usually 2" cases as stated. Serial numbers are,

50c/s E-10-A/1, D-505-A, D-787-A, D-787-B

60c/s E-10-A/2.

From the preceding the reader should now be able to identify a unit and assess its suitability for indication purposes, the voltage requirements and the c/s it may need. 400c/s units could be used at 400c/s by using a suitable oscillator.

Setting Up The Units

The author obtained a couple of transformers from the junk pile that sits in his shed. One had several taps on the secondary which included 20v, 30v, 40v and 50v. A multi-meter on the transformer gave the following AC readings, 20v, 32v, 41v and 53v.

The rotor requires 50v AC. The X and Y windings were connected as illustrated in Figure 2. The 1,2,3 screws were connected from the transmitter to the receiver. The 53 volt tap was tried first. The transmitter rotation was quickly and "firmly" followed by the receiver. There was no hesitation in the start of the indicator needle movement or "coasting" to a stop by the needle after the transmitter had stopped being rotated. There was a slight hum from the indicator however. Selsyns run cold but with a very slight hum normally. It should only be very slight however.

The next voltage was 20v but was totally useless. The 32v tap allowed the needle to move about but sluggishly. The needle moved after the transmitter was rotated and "coasted" to a stop after the transmitter stopped. If the transformer was switched off and then on again, the surge of current, on start up, sent the indicator needle around a few more degrees. This indicates that the 32 volts was not sufficient to set the needle to the correct reading in the first place.

Using a dropping resistor, a voltage of 48 volts was tried. There was no hesitation or coasting. There was no needle change on start up indicating that the needle indicated the correct reading the transmitter sent it. There was no audible hum from the indicator, even when it was placed on an empty metal tin. Experimentation may be required depending on the units which are acquired. Some may not hum at 50 or so volts. You may only have a transformer of 45 volts. It depends on individual circumstances. The author used ordinary light flex twin lead for X,Y and used a much lighter wire, similar to telephone cable, for the 1,2,3 connections. 50 volts AC appears on all wires by the way.

The manufacturer warns that the units should not be mounted with clamps around the case of the units. A friend VK5LV, John, does use this method but has insulated his units with foam rubber, between the case and the clamp, to silence any hum, with entirely satisfactory results. Under these circumstances clamping seems to be ok. The cases are usually clamped by pressure units at each **end**, using clamp rings. These may or may not be attached to the units which you buy. All of the author's had clamp rings attached and this is probably the usual case, so it is not a worry. If yours don't, then clamp them lightly with sufficient rubber to cushion the case, ensuring the case is not squashed out of shape.

The author hopes this is of some use to amateurs enterprising enough to sort something out for themselves. Remember that there is a lot of useful gear out there in radio amateur land. All you have to do is look and ask. Then be able to recognise what it is you are looking at. Recently the author was in a junk yard and saw an old "Treatment" unit from a hospital. It had the unmistakable dial of a variac on it. Further inspection showed it was a high power oscillator with a large RF transmitting triode, suitable for linear SSB amplification in it, plus the transformer etc. The author bought it for $5.00 but that is another story. All you have to do is look. **ar**

Radio Amateurs: Have you checked out EA lately?

No doubt most radio amateurs are aware that *Electronics Australia* is by far this country's largest-selling electronics magazine, as well as being its oldest (we began way back in 1922, as *Wireless Weekly*). But have you looked inside the magazine lately?

Remember Jim Rowe, VK2ZLO? Jim used to be Technical Editor, and then Editor – back in the late 1960's and 1970's. You may recall some of the amateur radio and test equipment projects he developed, which proved to be extremely popular. Well, Jim is back at the helm of the magazine, and has been busy giving it a new lease of life.

You'll now find lots of new 'departments' in the magazine, including Solid State Update (with news of new semiconductor devices), Silicon Valley Update (news from the USA) and What's New in Entertainment Electronics. Plus all of your old favourites like Forum, The Serviceman, Circuit and Design Ideas and so on. And of course plenty of 'meaty' technical articles and contruction projects.

FEATURES IN OUR NOVEMBER ISSUE:

AUSTRALIAN QRP IS ALIVE AND WELL

A look at low power 'QRP' amateur activity around the world, with special emphasis on what's happening here in Australia. Written by Tom King, VK2ATJ

SIMPLE FM TRANSMITTER FOR 2 METRES

At last! Here's a low cost, easy to build solid state FM transmitter for 2 metres, in modular form. Nothing fancy, but it puts out a clean crystal-locked signal of about 1.5 watts – great for your own QRP experiments!

THE RACE TO MAKE PHOTONIC IC CHIPS

The future of communications may well be with *photonics* – which uses light photons instead of electrons. Here's how it works

What about *amateur radio* projects? Well, there still aren't too many, at present – Jim Rowe's been a bit too busy! But he's *very* interested in boosting the amateur radio content, so if YOU have developed an exciting amateur radio project, please contact Jim by writing to him at EA, 180 Bourke Road, Alexandria 2015 or phoning him on (02) 693 6620 – to discuss the possibility of publishing it as a contributed article.

Take a look at the new, rejuvenated *Electronics Australia* – on sale at your newsagent at the beginning of every month. Or subscribe now, by phoning (02) 693 9517 or 693 9515.

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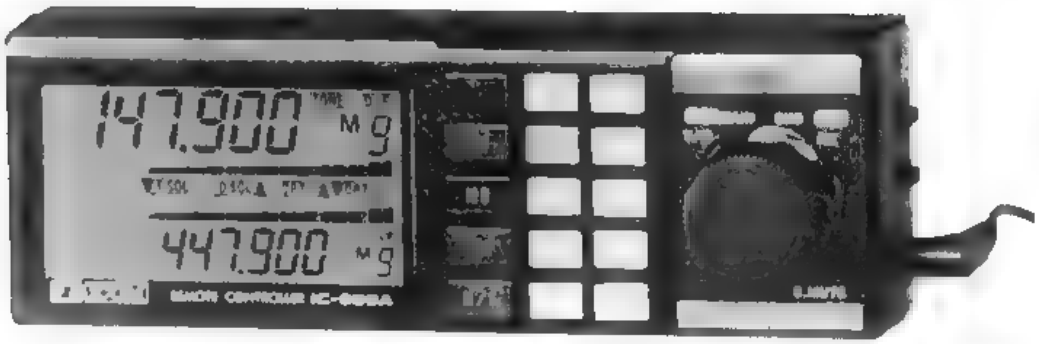
WIN

AN ICOM IC-900A MULTI-BANDER SYSTEM VALUED AT $2000



Remote Controller

How would you like to win a fantastic ICOM IC-900A series multi-band mobile control unit, complete with modules for two metres and 70 centimetres, plus your option of either six metres or 10 metres?

Thanks to ICOM Australia Pty Ltd, the winner of this competition will receive a magnificent IC-900A multi-bander system set up for 144 and 432 MHz operation, and will be able to select either the additional six-metre or 10-metre module.

However, you could still be a winner, even if you do not win this IC-900A. The three runners-up in this great competition will receive a full refund of their 1990 WIA membership fees, worth up to $65.00 each.

Who can enter?

This great contest is open to any person who is a financial member of the WIA as at 1st February 1990, except that employees or office bearers of the WIA Divisions and Executive are not eligible to win a prize.

How to enter?

Easy! Fill in this form by completing, in less than 30 words, the statement "I am a member of the WIA because . . . .", place it in an envelope together with your address label accompanying this issue of Amateur Radio magazine, and post it to "WIA 80 Competition, PO Box 300, Caulfield South, Vic, 3162", to reach us no later than 1st February 1990.

A photocopy of this form may be used if you do not want to cut up Amateur Radio magazine, but the Amateur Radio address label must be the label used to mail this issue of Amateur Radio magazine to you. This competition will be run over a period of three months, and WIA members can enter three times if they so desire.

The winning entries will be selected by a judging panel, and the winners will be announced in the March 1990 issue of Amateur Radio magazine.

WIA 80 Competition PO Box 300 Caulfield South Vic 3162

Dear Sirs,
I wish to enter the WIA 80 competition, and accept the rules as published.

I am a member of the WIA because .....

.....

.....

.....

.....

(Complete this statement in 30 words or less)

Callsign or
Membership Number ..... Signed .....

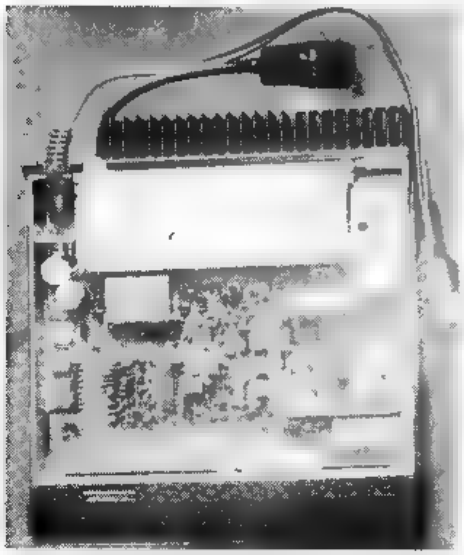
THE ICOM IC-900A MODULAR MULTI BAND FM TRANSCEIVER

Ron Fisher VK3KOM
"Gaalanungah" 24 Sugarloaf Road Beaconsfield Upper

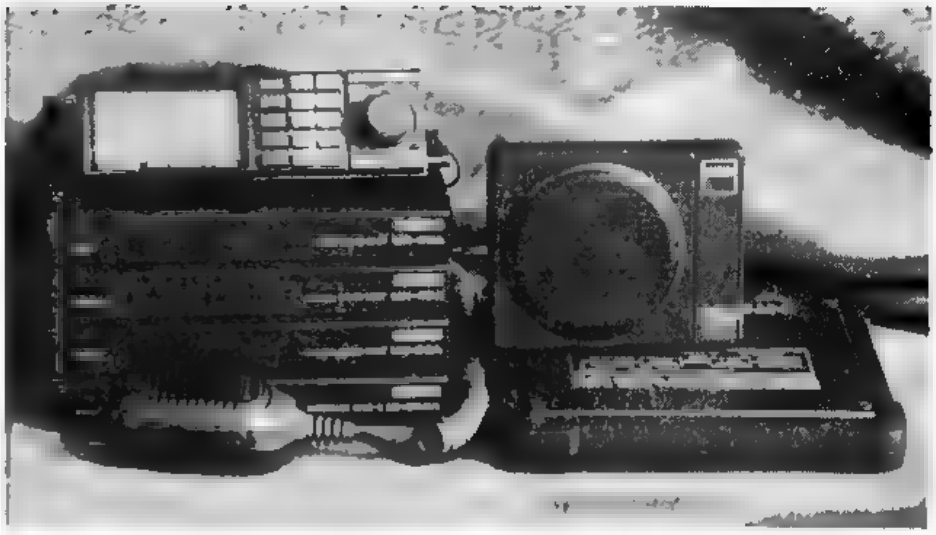
First of all, let me wish you luck in the WIA80 competition. I hope you win this wonderful rig. Having used it for the last couple of months, I don't like giving it up. However that's one of the problems of being an equipment reviewer. There is no doubt about it, the IC-900 is one of the most unusual rigs that I have come across. I rather get the idea that ICOM engineers decided to try out a few innovative technical thoughts that they might later use in other applications.

The transceiver actually comes in several pieces with a very small control panel that can be placed in any convenient position. This is then connected by a very thin cable to the interface unit which can be mounted under the car seat or tucked up under the dash board. The standard ICOM PTT microphone is also connected to this unit as is the separate loud speaker. There are, in fact, two speaker sockets, so you can also have one for the back seat passengers. There is a long DC cord attached to the interface unit, nearly seven metres long. ICOM must think that we all drive buses or something but, if you are like me, I always run out of cable at the wrong time. Now, if you thought we had covered all the units, you are wrong, there are still some to go.

There is a second interface unit that is connected to the first, via five metres of fibre optical cable, and on the back of this are the connectors for the various "band" units. Our prize unit is supplied with three of these for use on the 50, 144 and 430 MHz bands. These, along with the second interface unit, can be stacked away in the car boot or some other out-of-the-way place. Just as a thought, a longer interface connecting fibre optic cable is available as an option. This might enable you to use the whole thing as a base station with the control unit mounted in the shack and the "band" units mounted near the antenna to reduce losses in the feeder. In fact, I note in the latest ICOM news letter that the remote principle is being used in a new marine transceiver. The possibilities are endless.



Interior view of the 2 metre "Band" unit Photo - John Friend VK3ZAB



The complete set up. Ready to go. Photo - John Friend VK3ZAB

The "band" units are actually separate transceiver units for each band with a power output of ten watts on six, twenty five watts on two, and twenty five watts on 70 cm. They are all the same size and appearance. There is also available a unit for the ten metre band which again is for FM operation only. As you can see, this system needs quite a bit of thought and effort to install. It's not the sort of thing that you can throw into the car five minutes before setting off on a trip. However, once installed, you have a versatile thief proof, all-band, VHF/UHF set up.

Let's look more closely at the physical aspects of the "band" and interface units. The "band" units measure 175mm deep / 175 mm wide and 25mm high. The six and two metre units are fitted with flying lead SO-239 antenna connectors while the 430 MHz unit is fitted with a flying "N" type connector. Each is fitted with a DC power connector. Perhaps it should be made clear that no controls are fitted to any of these with all control functions coming from the remote control unit. This measures only 153mm wide, 50mm high and 38mm deep. With a weight of only 200 grams it would be quite feasible to secure it to the car dash board with double sided sticky tape. This unit contains a three by five push button matrix for frequency and memory selection.

A green illuminated LCD multi purpose display takes up most of the left half and a channel selector knob is to the right. Audio volume and squelch are controlled by rocker switches with the volume/squelch slowly increasing or decreasing as you hold the button down. This is very neat but of course there is no way of knowing where each is set until the rig is turned on. With separate modules for each band full duplex operation is possible

The control unit display shows both the main transceiver frequency plus the sub-band which can be selected simultaneously for receive. A small button near

the tuning control allows the sub band audio to be selected on or off independently of the main receiver audio level. If you were to connect a second speaker, it is possible to have main and sub band audio from separate speakers. There are ten memories for each band and repeater off-sets can be programmed with the memory. Also high or low power can be selected for each unit.

A single push of a button can interchange the main band and the sub band, so if you are transceiving on two metres and suddenly hear a call on 70 cm which is set up as the sub band, one push and you are talking on 70, another push and you are back on two metres. Also direct access to a call channel is easily available. All of this magic is available to the operator via a CPU contained in the control unit. There are even two 'S' meters but as we shall later see they are typical for VHF FM transceivers - almost useless.

The IC-900A On The Air

Over the last few years I have operated an ICOM IC-28A in the car and consider it to be one of the easiest FM rigs to operate. The 900 is somewhat more complex and it takes time to get used to all the facilities. I did not attempt to set it up in the car but instead spread it around the shack floor. Luckily I have a dual band antenna for 146 and 430 MHz, along with a diplexer, but so far no antenna for six. My on-air tests were therefore confined to 2 metres and 70 cm. I was able to check out the six metre unit on the test bench though.

Receiver sensititivity on two appeared to be good, but when compared directly with the IC-28A it was found that the 28 was, in fact, slightly better. However, to balance this, the received audio quality on the 900 sounded better. Transmitted quality was rated as good, but with a very small amount of synthesizer noise audible to close stations. Deviation was rated as just right. One thing noted was that the modules got rather hot after a period of testing. If you decide to mount the 'band' modules in the boot, don't throw your travel rug over them or pack the grocery shopping too close. An optional cooling fan is available but even with this, some space around the unit would be necessary. I guess the heating problem would be more pronounced if you like to use the duplex mode. However, as far as I can hear, this type of operation is not all that common as yet.

The IC-900A On Test

As I mentioned earlier, I did not have an antenna for six metres and at the other end, I do not have a signal generator that goes up to 430 MHz so some educated guesses had to be made.

Receiver sensitivity was first checked on the 50 and 144 MHz units. For 12dB sinad, 50MHz was 0.15uv and for the 144 MHz unit it was 0.16uv. It was noted that the squelch would open well below these figures. Next, receiver audio output power was measured at both 8 and 4 Ohms and was found to be rather higher than usual at about 3 watts for 8 Ohms and just over 4 watts at 4 Ohms. Received distortion at 5 kHz deviation was just about 4% for both bands. This amount of distortion is not as good as many current FM transceivers but quite satisfactory for speech transmission. Transmitter power output was checked on all bands using my usual dummy load power meter. In all cases the measured output exceeded the specified output by a small margin. The following results were recorded

	6 metres	2 metres	70cm
High	11 watts	26.5 watts	25.5 watts
Low	1.2 watts	5.2 watts	4.5 watts

All of these were measured with 13.8 volts DC input to the transceiver. The last and most important measurement was the "S" meter calibration. It was almost the same on both six and two metres. Both had a total range of about one normal 'S' point, that is about six dB. In other words it will tell you if you are hearing a signal or not. I should say that this is fairly typical for modern FM transceivers and is something that manufacturers should have a close look at.

As I mentioned earlier, results of performance on the 430 MHz receiver had to be subjective. I compared the receiver with a four year old transceiver that I have used intermittently over the years and found that the IC-900A performed in a similar manner.

The Instruction Book

I must admit that I was rather disappointed with the manual. As the IC-900A breaks new ground in amateur equipment, I feel the least that ICOM could have done would have been to explain how it all worked. This is, after all, the beginning of a new concept, and I am sure we will see more of it in the future. The actual operating and hook up instructions are well covered. I would strongly suggest that the new owner take time and read the book through several times, before connecting it all up and starting to try and get it on the air.

The IC-900A Conclusions

I wonder when ICOM might see fit to produce a control head and interface unit to remote control an HF SSB transceiver mounted in the boot of the car. I feel that this must come in the very near future, and the sooner the better. This system proves that it can be done. After all it is still possible to mount a two metre transceiver inside a car (just), but I don't know of any modern car that will take an HF transceiver under the dash board.

However, back to the IC-900A. I can think of many ways that it could be used both as a mobile and fixed station setup. If you happen to win it please let me know what you do. I will be waiting with interest.

Our sincere thanks to ICOM Australia. **ar**

STOLEN EQUIPMENT

1 x Kenwood TR2600A 2m handheld transceiver SN 5060934, missing hand strap, with MS30 mobile bracket and SMC30 speaker mic & DSE 1 amp switchable voltage power supply cat. M-9530, also has home brew 1/4 wave telescopic antenna.

1 x Kenwood grid dip oscillator, model DM81, stencilled in 20mm bright yellow letters "Applied electricity R 1259." SN 4020163 stolen from Ellis Horman VK2KLF, 38 Leura Rd, Auburn 2144 on 10/8/89.

ar

Repeaters - addition, deletions, alterations. Have you advised the WIA Executive Office of changes to the repeater list?

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VNG UPDATE

MARION LEIBA
HONORARY SECRETARY, VNG USERS CONSORTIUM
26 FIMISTER CIRCUIT KAMBAH ACT 2902

My article, "The resuscitation of VNG" (Amateur Radio, vol 57, no 3, March 1989), covered VNG's adventures and misadventures to near the end of January 1989. At that time, VNG was transmitting on 5 MHz on a three-month temporary licence which had commenced on 8 December 1988. Because of interference complaints when a vertical aerial was used, it was being radiated from a Wells quadrant aerial with 5 kW power and a VSWR of 2.5:1.

Equipment

Considerable progress has been made since that time. On 31 January, the aerial was stubbed and VNG is now going out at 10 kW power on 5 MHz with a VSWR of 1.4:1. All four transmitters have been operational, but the modulation transformer in the standby blew recently and is being repaired.

When DOTC gave permission for VNG to undertake experimental transmissions on 10 and 15 MHz near the end of June (see below), radiation took place initially from stubbed Wells quadrant aerials. This has proved satisfactory for 10 MHz (VSWR 1.4:1), but was a disaster for 15 MHz. The transmission lines burnt through at the stub! The 15 MHz transmission is now taking place from a stubbed quadrant aerial with a single strand of wire on each arm.

The two private lines to Telecom Research Laboratories have been installed, so the BCD time code came back on VNG on 29 March 1989, and the precision quartz oscillators are once more phase-locked by the two-tone signal generated by Telecom's caesium beam master standard. The BCD time code gives day number of year, hour and next minute. Please contact me if you would like to know how to decipher it.

Licensing

With the exception of brief shutdown periods, VNG has been transmitting continuously on 5 MHz on a series of three-month licences. DOTC has now granted a one-year licence for continuous transmissions on 5 MHz, valid until 6 September 1990, provided that there are no serious international complaints.

DOTC has also granted an experimental licence for transmissions on 10 and 15 MHz until 30 November 1989 at times to be agreed by DOTC depending on international reaction. At present the transmissions on these two frequencies are taking place between 2200 and 0700 UTC each day.

We are still awaiting the necessary international approvals so that permanent licences can be granted. DOTC has advised that Papua New Guinea has given its approval, but there has been no other official reaction.

However, because of complaints to the Consortium of co-channel interference in Antarctica and New Zealand, the four Canberra-based members met with the Minister for Communications, Ros Kelly, and officers of DOTC on 30 August to request frequencies other than 5, 10 and 15 MHz. Our preferred option was 4.5, 7.5 and 16 MHz. We were informed that out-of-band frequencies would not be considered, because of the crowding of the radio frequency spectrum, so 4.5 and 7.5 are out. However, DOTC has agreed to investigate the possibility of 16 MHz instead of 15 MHz. Whether we get it will depend on the number of licensees who would need to be reallocated.

Marion Leiba with her son Kenrick (aged 7) in front of the 15, 10 and 5MHz VNG transmitters at Llandilo

Overseas Reception Reports

The 15 MHz (and more rarely the 10 MHz) transmissions have been booming in to Europe, and we have been flooded with reception reports, particularly from West Germany, Italy and England. VNG has also been reported from Austria, Belgium, Spain, Scotland, Wales, Holland, Greece, Hungary, East Germany, Czechoslovakia, USA, Canada, India, Indonesia and New Zealand.

Since transmissions commenced on 10 and 15 MHz, the daytime usage of VNG has increased considerably. It is now being used for time-keeping at over 40 seismographs (earthquake recorders) throughout Australia. Other users include automatic and semi-automatic FM radio stations, surveyors, electric power authorities, SWLs, radio amateurs, professional astronomers and around 80 amateur astronomers.

Funding

In June this year, AUSLIG (Australian Surveying and Land Information Group of the Department of Administrative Services) agreed to fund VNG for at least five years provided that it achieves sufficient cost recovery from users by purchase of its bulletins (contact Orroral Observatory, AUSLIG / DAS, PO Box 2, Belconnen, ACT 2616 for more

Steve Lester measuring the VSWR on the 10 MHz feeder prior to stubbing the aerial on 26 June 1989. Ian Pogson VK2AZN looks on.

information). Alternatively, you can help keep VNG on the air by contributing to the VNG Users Consortium. We pay some of VNG's incidental expenses (such as our GPO Box 1090, Canberra, ACT 2601, mentioned by Graham Conolly VK2BL on his current VNG station identification announcement, which was recorded free of charge in the Sydney studios of the ABC) The balance of Consortium funds will be remitted to AUSLIG near the end of each financial year as a partial reimbursement of VNG's running expenses (an estimated $40 000 per annum).

Many people have worked very hard (some of us unpaid) to achieve the current progress with VNG. We would appreciate your making a yearly pledge of even a few dollars to help justify AUSLIG's support. It also demonstrates to the Government, in concrete terms, that we really do think that this national facility is important. Please contact me if you would like to contribute. Non-negotiable cheques or money orders should be made payable to the VNG Users Consortium. ar

Have you advised DoTC of your new address?

A SHORT HISTORY OF COMMUNICATIONS

TED ROBERTS VK4QI
38 BERNARD STREET ROCKHAMPTON NORTH 4701

FINAL INSTALMENT, CONTINUED FROM JUNE ISSUE.

If an oil terminal is in imminent danger of exploding with disastrous results to a community, it is obviously more important to have the area cleared with the minimum delay than to insist that security be observed.

The security of the message is the third requirement for a good communication system. Some messages of their very nature require immediate and urgent action, and the action desired is more important than the security of the message. If an oil terminal is in imminent danger of exploding with disastrous results to a community, it is obviously more important to have the area cleared with the minimum delay than to insist that security be observed.

Anyway, in these days of scanners, all such services are monitored by a large number of people including the news media, so security is very short-lived in such circumstances On the other hand, services which regularly handle such matters as military and diplomatic traffic, not forgetting those dealing with decisions affecting the prices of commodities and stocks and shares must be as secure as possible.

If the security lasts until after the event it has at least achieved its purpose, but it would be more secure if there was no access to these messages at all. This is the ultimate in security and it can be seen that no message can be classified as truly secret if any eyes, other than the originator and the addressee, have access to it. This is obviously impossible if the message must pass through a communication channel between these two, so some form of complicated cipher and reciphering method must be used Unless the originator and the addressee attend to the enciphering and deciphering themselves, we are forced to employ another two people to encipher and decipher the message. So our minimum number of people cognisant of the secret message has grown to four. If the message must be repeated to several other people, then the number of cipher clerks, ratings, or officers must increase similarly. The security in this case is diminished, but it all hinges on the honesty and security consciousness of the cipher personnel. Should the message be filed in a filing system by filing clerks, then the security is further downgraded The filing of a truly secret message is to be deplored, as it is then available to be read by others by accident or intent. The meaning of secret would preclude knowledge of its very existence Lesser degrees of security are the norm however, and in the case of SES or WICEN-type operations, would normally mean the operators passing on requests for information to the officer directing an operation or his deputies, unless authority is otherwise delegated. It is a good thing to have this point clear at the outset of any operation undertaken by these organisations so everyone knows where they stand, and no partial truths about the operation are passed on to the media or other persons making inquiries.

Having considered the need for speed, accuracy and security as essential items in the moulding of a sound communications system, we can now discuss the way to implement these needs in the development of a training program for intending communicators.

Any member of the organisation will fit into the system anywhere and be able to pass messages to and from all points of the system without unnecessary delay and with perfect accuracy.

Speed can only be achieved by considerable practice after laying down a thorough and universal training program. It is of no use one person laying down one system of procedures and another down-the-line another system and so on ad infinitum. Each system will work successfully but they will not be universal and there can be no common interface from unit to unit. Therefore, we are back to square one with a little gained and a lot lost in the need to retrain everyone in the same procedural system. This will ensure that any member of the organisation will fit into the system anywhere and be able to pass messages to and from

all points of the system without unnecessary delay and with perfect accuracy. Obviously this will not occur overnight and can only be the result of long and patient training over quite some time. It is at this point that these organisations must undertake their own training programs and it is to be hoped that this article points out the necessity for that training and the reasons to develop a high degree of self discipline amongst the trainees in order to ensure a well-run communication system by these organisations

One point has not been raised as yet about our messages and that is the allocation of priorities for different grades of messages. Most traffic passed will be of a routine nature and it is of no great matter if they are delayed for a small time There is no need for delay if the channel is open and no other more urgent traffic is waiting for transmission and the normal principle is to transmit the messages in the order of their being lodged for transmission.

Some messages, by the nature of the action required by the addressee, will need to be passed on ahead of the routine traffic. These messages will require handling with a degree of priority or precedence as can be easily understood In the WICEN and SES services, these degrees of precedence are of four orders. They are, in increasing degrees of importance:

Routine
Priority
Immediate
Flash

The use of a higher degree of priority than justified is unnecessary and will only cause delay in the transmission of those messages truly meriting their degree of priority. The use of the precedence Flash will not normally be used on WICEN nets but may well be used on SES nets Where a message is addressed to both action and information only addressees the precedence is usually downgraded to routine for the information addressee

It is a fact of life that the transmission of messages over the telephone is the weakest link in the chain On the other hand, transmission by telegraph is done by trained personnel and the accurate copying of messages is inherent with this medium As this method is not used in SES and rarely used in WICEN, we will not further consider this mode of operation and concentrate on the voice method of message handling

Speak clearly and break the message up into phrases that make sense in themselves!

Imagine a line of some 12 or more people spaced a couple of metres from each other. If one whispers a short sentence to the last person in the line, who then moves up and whispers this message to the next in line and so on, the message spoken out loud by the person receiving it at the head of the line will usually be significantly different than when it was first passed for transmission.

The main reason for this is inattention to what is being said. If the message is what the listener is expecting there is very little corruption in handling it, but if the content is unusual or unexpected, the error rate rises rapidly. Further difficulties may be the existence of hearing defects (sometimes unknown) and bad speaking habits on the part of the participants.

The first area we can try training budding operators is in the proper way to speak when passing a message. Speak clearly using a natural rhythm and break the message up into phrases that make sense in themselves. Do not speak at high speed but speak slower than normal. Remember that the person at the other end has to write the message down so give them time to do so, otherwise they may do the same to you when they get the opportunity. Apart from that, speed causes parts to be missed and requests for repeats which slows the overall speed considerably. It is a great help to keep the volume and pitch of the voice constant. When using a telephone handset or a radio microphone, speak into them properly and do not let your attention wander and speak into, under, or over the microphone as you move your head around following some other action.

In voice transmissions, it is usual to spell unusual or important words to ensure their accuracy. At first sight this would seem to be very easy but a universal method of spelling is required which will not cause confusion to all concerned. Ordinary spelling runs into the problem of letters which are pronounced alike such as B and D and these cause further confusion when spelling words instead of removing the original problem. For this reason, many attempts were made to create suitable phonetic alphabets but most suffered from some problems.

One of the earliest systems used by the British Army, perhaps before WWI, but certainly during it, was Ack, Beer, Cork, Don, Eddy, Freddy, etc. At this point we can see that Eddy and Freddy are very easily confused so this system defeats its own purpose. However, it was in use until the outbreak of WWII in some ar-

Maybe before this system was introduced, Bell Telephones or Western Union in the USA were using an alphabet which was based on large cities, i e. Amsterdam, Boston, Chicago, etc. The allies during WWII introduced a joint phonetic alphabet, such as, Able, Baker, Charlie, Dog. Easy, Fox, etc., and this was eventually replaced by the current ICAO phonetic alphabet which is in almost universal use today.

ALPHA BRAVO CHARLIE DELTA ECHO FOXTROT GOLF HOTEL INDIA JULIET KILO LIMA MIKE NOVEMBER OSCAR PAPA QUEBEC ROMEO SIERRA TANGO UNIFORM VICTOR WHISKY XRAY YANKEE ZULU

When an important or unusual word or address in the text of the message is read out, it is normal practice to say:

"Anastasia - I spell, ALPHA, NOVEMBER, ALPHA, SIERRA, TANGO, ALPHA, SIERRA, INDIA, ALPHA. - Anastasia" and then continue reading the rest of the message. Where numbers or addresses occur, it is usual to spell them out also to avoid confusion. In the case of numbers, the procedure is to say, 'FIGURES, WUN, TWO, THUH-REE', and carry on with the rest of the message. In the event an unpronounceable word is contained in the message, it is usual to spell it without first pronouncing it as follows:

"Part number, I spell, DELTA, TANGO, XRAY, SLANT, WUN, NINER, SIX, SLANT, BRAVO, OSCAR" for DTX/196/BO.

A strong sense of self-discipline is necessary on the part of the operators in order to allow a radio net to operate with minimum problems. It is necessary for all stations in a net to have a common time basis so it makes good sense to synchronise time at all stations.

The successful operation of the net depends mainly on a disciplined appreciation of the fact that the Net Control Station is exactly that and should be obeyed implicitly Unnecessary tuning on the net frequency is to be deplored as bad manners and operating on the part of the offenders and this practice leads to possible blocking of important traffic Unnecessary and idle chatter is another means of demonstrating poor circuit discipline and cluttering of the channel. Remember that a WICEN or SES net is a communication channel and not a natter channel. There is ample scope for this type of operating on CB or other amateur channels where they are no longer cluttering up the communication channel.

The necessary training in operating

Continued on page 45

HOW'S DX

STEPHEN PALL PO BOX 93 DURAL NSW 2158

Hurricane Hugo

The Caribbean is known not only for the many beautiful islands with exotic prefixes, but also for its hurricanes. The latest, Hurricane Hugo, with winds up to 230 km/h during one week rampage over 3500 kilometres, killed 47 people in the Caribbean and southern United States and caused over $US3 billion damage

The news media was full of stories about the devastation and the difficulties caused by the total breakdown of commercial communications. One could hear practically every day, the reference made to "ham operators", "amateur radio operators" who still had the facilities with battery operated sets, makeshift dipole antennas which replaced the expensive damaged yagi beam antennas, and were able to assist in the emergency with traffic handling. 14325 kHz was occupied continuously 24 hours by the Miami Hurricane Centre, other emergency traffic was using 14275 14283 14303 14315 kHz, and the United Nations traffic net from New York was conducted on 14330 kHz If you listened on these frequencies, you heard the tragic news instantly. Due to skip conditions, several VK Stations were also assisting by passing back messages across the Pacific from the Caribbean to other parts of the US.

Walvis Bay

It was early June when Ian, ZS1IS appeared on the bands, both CW and SSB. This could be a potential "New Country" in the future, as Namibia is looking forward to its first independent elections and its own government. Lately several amateurs: US, French and ZS had a short visit to ZS1IS, and with additional equipment have improved the QSO rate between ZS1 and the rest of the World For the September QSOs, where the operators signed with names other than Ian, - the QSL goes to KC1AG

Bouvet Island

Pat, VK2RZ in the September issue of Amateur Radio, already announced that there will be a DX-Expedition to this remote part of the Southern Arctic Ocean in December It is planned at Christmas time, and the operators will be Einar LA1EE, Erling LA6VM and Kaare LA2GV The prefix of the inhabited Island is 3Y, the suffix is not yet known. The DXpedition is backed by the LA DX Group, and the estimated budget is $200,000. The organisers hope that the world amateur population will make donations to the tune of $100,000. Bouvet is one of the most sought after DX prefixes, and there are not many VKs who worked this island in the past. The first operation was in 1962, the second in the late 70s, and now this one. We strongly suggest to our DX readers to make donations to this cause, however small. The address is: Club Bouvet, Box 88, N-1361, Billingstadsletta Norway. Bank draft should be made out to: Club Bouvet, Den Norske Creditbank, account no 7085 05 07382.

Afghanistan - YA

It was reported by several DX-ers that YA5DD was on the air in September. It appears to be a Club station with several amateur operators, however officially there is no news about this operation.

Most likely it is a legal operation; they have even given a post office box no for the QSL: PO Box 1118, Kabul, Afghanistan.

Hungarian DXpedition in Mongolia

JT0DX, in Ulan Bator was heard operating on 28516 at 0900 mostly Europeans. QSL goes to HA6KNB.

News From Here and There

John, PA3CXC/ST0 arrived in Sudan and everybody was ready to work him. He was heard only once conducting QSOs with two stations, then there was a big silence. At one stage there was even some doubt, whether the signals heard were "genuine". After a few days the mystery was solved: John arrived and went on air, but operated only for a very short time. He "blew" his finals, stopped operating and returned to Holland.

Roland, F8EN will be in Gabon in November 89, using the callsign TR8CR.

Irma VR6ID is on the bands around 0800 UTC on 1430 on Sundays. Her QSL manager is KB6ISL.

June TL8JL, was operating from the Central African Republic with 56 report on the longpath.

QSL to: K4UTE Wilham R Hicks, 7002 Deauville Road, Jacksonville, FL 32205 USA.

Evan H5AA was operating from Bophuthatswana. This is a so called "independent" nation, one of the homelands in South Africa. It is an official callsign, but it is not recognized as a DX Country. The coordinates are: 26 deg South and 26 deg East.

VR6CL is not located on Pitcairn Island He is operating as marine mobile, and waiting on a FO call sign

In the past I have worked several Austrian (OE) stations which were part of the UN Peacekeeping force on Golan Heights using their own callsign with a supplementary suffix of YK. This counts as a YK QSO However at the end of September, I was fortunate to work Rasheed, YK1AA. QSL direct to Box 35, Syria.

Interesting QSOs and QSL managers

A92BE, Don in Bahrain, QSL direct to Callbook address.

ED5LBD Special prefix celebrating the Anniversary of the EA DX Association QSL to EA5FKQ.

SV8RX Giorgios on Zakinthos Island (Xante)

CS7YH, Lucia, QSL to CT1YH

ZS1IS, Pierre in Walvis Bay QSL to KC1AG

9M2PL/P/9M8, Ganesh visiting his father QSL to 9M8PV.

4S7RO, Ron in Colombo, QSL to DJ9ZB

VQ9MC Dennis on Diego Garcia Islands Group. QSL to K8QMC

7P8DX El in Lesotho, QSL to callbook address

7X5ST Saad in Algiers. QSL to PO Box 2, Algiers, Algeria

HP6AYV Victor in Panama From the 16th Sept. QSLs to I0WDX

9X5AA Rod in Rwanda, Africa. QSL to W4FRU.

ZK1WL Warwick on Penrhyn Island, North Cook. QSL to Box 90, Raratonga, Cook Islands

3B8FV Gerard on Mauritius Island QSL direct to PO Box 62 Quatre-Bornes, Mauritius.

S79SC Simon, who was born in VK6 QSL to Box 234, Seychelles, Indian Ocean

BZ4RCC One of the few personal calls in China. Cheng on 14187 kHz. QSL to Box 1827, Nanjing China

PJ2ELB Wim visiting his brother in Curacao. QSL to PA0WGS

TI2KX QSL to WA4JTK NP4A QSL to W3HNK

ZS3HL QSL to W3HNK TR8RS QSL to Box 5487 Libreville, Gabon, Africa

S79T QSL to JI3ERV

Interesting QSLs received.

YJ8RG, 6Y5IC, 5W1GT, ZS3GB, T5MF HC8JG, V85NR, T32AF, HC8DX, TI2YO, JW6WDA, JW5E, ZL9BQD, T28RW T26LP, P4OV, V47RF 9X5KP ar

VHF - UHF

AN EXPANDING WORLD
ERIC JAMIESON VK5LP 9 WEST TERRACE MENINGIE 5264

Twenty Years Down The Line

The publication of these notes in this issue of AR represents the end of 20 years of such reporting from my desk.

In that time there have been many changes, eg: the establishment of an Australia-wide beacon network, the consolidation of SSB and FM as an integral part of our operating procedures; the ever-gradual shift to more operating at frequencies in the UHF and SHF bands; an increase in EME activity, packet radio and satellite operation, three sun-spot solar cycles and, most recently, the return of usage of the 50MHz band. No doubt the availability of good commercial amateur equipment has helped in many ways to achieve some of the more complex activities though considerable home-brewing is still necessary if your sights have been set on the regions above 1296MHz.

These notes have appeared regularly, covering a wide range of interests and subject matter allied to the bands above 50MHz, thanks to the support shown by many readers who have written letters containing information of interest to others.

There are a few correspondents still sending information who have been part of these columns for many years. Others come and go, some will write after a long break, and so it goes on. Your input, no matter how large or small, has always been gratefully received and acknowledged in some way through the columns.

From time to time I write something which is seen by some to be controversial enough for some flak to fly, and, of course, some falls on my desk. Providing it is sensible flak, I do not mind, as it can draw my thinking to a way which then can be of benefit to all. If it becomes too personal, I can choose to ignore it - fortunately such instances have been very rare over the 20 years.

My writing career commenced in 1938 when, at the age of 14 years, I provided SWL information for a column in "The Adelaide Advertiser" and the Melbourne "Listener In". Since then, my shoulders have broadened sufficiently to handle all manner of people and the loads they represent!

However, there have been many enjoyable moments. I have met some very fine people as a result of my amateur radio activities, and particularly through the writing of these columns. The preparation has taken a vast amount of my time and cost me considerable money, due to STD phone calls, fax usage, postage etc. But none of these costs is begrudged, as I see them as my contribution to the furthering of the cause of amateur radio, particularly in the field of VHF and UHF. The fact that I am well known on the air has its rewards, in that other operators can give me a small news item, and certainly they acknowledge that I do exist!

Later I may write a resume of the past 10 years along the lines of my first 10 years, published in 1980. However, for the moment, I will remember these November notes for two important reasons, the first being the end of the 20-year period, and the other being that they are being handwritten from a bed in the Memorial Hospital, Adelaide, where I am recovering from a further operation to my back, in an effort to keep me walking.

Apart from anything else, I am missing the facility of my word processor, which cannot readily be brought to me for use in a hospital ward! However, I will do the best I can from a rather awkward situation - it would have been easy to say it is too difficult, but then, I have you, my readers to consider.

Brunei

Andrew V85DA reports that six metres had been very quiet until 30/7 when he worked YB0ARA and YC0UVO. 5/8. JA8RC and JH0INP on CW. 24/8. 14 JAs on SSB between 1530 and 1630 UTC. 25/8. VK8RH and VK8AH very strong at 1320. 27/8: 0813-0929 64 JAs followed by a further 21 on 28/8. Almost daily contact with JAs. On 7/9 at 1250 worked VK8AH, who said he earlier had worked VS6XWU. 11/9 was a good day with JAs, H44HIR beacon, VK4RTL, VK8RAS, VK4RIK etc. At 1217 VK6RO was heard weakly. Same day between 1320 and 1412 Andrew worked 62 JAs on CW. On 11/9 and 12/9 JAs, VK4, VK8 etc.

Andrew ran a scan on his data base and found he had worked 632 different six-metre stations from Brunei and, of these, 566 were JAs. His total QSO count is 875, with 775 from JA. He has now worked 42 JA prefectures and 111 JA cities, all confirmed. Andrew also advised VK8RH in Darwin was continuing to work JAs on 144MHz.

News From South Africa

From "ZS VHF NEWS" comes advice of several beacons. Most direct their antennas to Europe, but ZS6DN is directed towards VK and operates continuously on 50.050.

From Marion Islands, ZS8MI operates with an IC551D and a four-element beam. J52US closed down on 30/9, but hopes to be operational from Sierra Leone in January 1990. Others to come on are Mal, Z23JO and A22BW, and moves are under way to supply 3DA0AU and 7P8DP with six-metre equipment.

Through June and July the South Africans had relatively quiet conditions, with a brief opening to G and PA on 4/6, and to OH on 12/6. On 22/7-23/7 openings occurred to EI, F, G, GJ, GM and 9H. As August progressed, their contacts to mediterranean stations increased, and good signals from G on 5/8, 13/8, 16/8, 25/8 and to LA on 8/8 and 25/8. Their pattern of operation conditions closely follows those of VK, ie to the north. However, they are constantly reminded that VK does exist, and are asked to look to Australia between 0600 and 0800 UTC.

Well known operator, Peter Carey, ZS6JT has closed his 432/1296 EME station following recent heart surgery. Peter pioneered EME from Africa as ZE5JJ from Zimbabwe, before moving to South Africa several years ago. From the Australian VHF/UHF fraternity we wish Peter a speedy recovery.

50MHz Beacons

Following my September request for input on the subject of beacons on 50MHz, some correspondence has arrived on my desk. So far it seems very obvious that we should move with great caution so as not to jeopardise the DX potential of the band, particularly when related to the narrow segment available.

However, some writers should be aware that my comments were of an exploratory nature only, with no advocation towards widespread installations on 50MHz. As I pointed out, the days are gone when we can have the luxury of beacons in each state and widely separated in frequency.

Further views will be welcome, but please give your suggestions very careful consideration, particularly in regard to the effect of a strong beacon signal radiating in capital city areas having a high density of six-metre operators. Also, what happens in a noisy area when you turn on the noise blanker!

The Six metre Scene

Although out of touch with six metres due to hospitalisation, David VK5KK and Keith VK5AKM report very little activity. On 27/8

VK5ZBK worked JE1CCO. On 3/9 VK5NY and VK5ZMK worked 3 x JA8s and a JR7 around 0300. Following some auroral activity, VK3 and VK5 stations had an opening to W on 20/9. On 24/9 VK84H in Darwin worked ZD8MD around 2330 - the station being around for about an hour - a very good contact. At the same time it was reported YB0 was hearing the FY7 beacon. Finally, on 1/10, reports were received that W stations were hearing TV signals from Australia and New Zealand.

It seems inevitable the conditions should improve during October, and I should be home to share in these contacts

Graham VK6RO advised of some activity during August with ZL TV on 16/8 at 2356. On 20/8 he worked VK5RO at 0057, and observed TV on 48260 from 0424. On 22/8 0813 to 0830 he worked 4 x JAs, and had daily openings to JA for the next week, mostly around 0430. On 29/8 he heard HL0PV at 0630, followed by BZ1FB at 0705 and BY1PK at 0708, both on CW at 559 signals.

These two stations from China represented a new country for Graham. Congratulations!

Closure

Of necessity these notes are somewhat disjointed this time - hopefully by next month the VK5LP call sign will be on the air again.

Closing with two thoughts for the month: "Cats seem to go on the principle that it never does any harm to ask for what you want", and "It's daunting to see a youngster start his first job at a salary you once dreamed of as the culmination of your career!"

73. From the Voice by the Lake, but temporarily from near the River Torrens. **ar**

A SHORT HISTORY OF COMMUNICATIONS

Continued from page 42

procedures and exercises can be left in the hands of these organisations - after all, they have been doing just this successfully for a long time. If we approach either of these services with the fore-knowledge that good operators are made rather than born and are prepared to put in the necessary work and large amount of practice needed to become fully proficient, we can eventually reach the stage of being good operators in a well run net in a service to be proud of

ar

CONTESTS

FRANK BEECH VK7BC FEDERAL CONTESTS MANAGER
37 NOBELIUS DRIVE LEGANA 7277

Contests Calendar, RNARS Activity, Ross Hull, WIA VHF/UHF Rules.

November:

11th	Australian Ladies Amateur Radio Assn contest, rules last month.
11th-12th	Czechoslovakian DX contest, rules last month's "AR"
15th	RNARS activity contest SSB section, rules this issue.
16th	RNARS activity contest CW section, rules this issue

December:

23rd - 6th	Ross Hull Memorial VHF/UHF contest. Rules this issue AR.

January 1990:

1st - 6th	WIA Ross Hull contest continues.
27th-28th.	WIA Second trial VHF/UHF Field Day Contest. Rules this issue.

Contest news is a little thin on the ground this time of year, and very little seems to come this way from the overseas societies. However, the contest manager has plenty to do, and the Remembrance Day logs will be receiving some attention next week. I have already opened about 300 envelopes, some of these contain a few log entries bulk posted, so it looks as though the numbers will be about the same as last year.

The Ross Hull memorial contest has had the scoring changed slightly to induce the UHF boys to enter into the spirit of things more, and hopefully to send a log sheet to me, with the scoring and multipliers using the Maidenhead locator system. The contest is really open to all, and no high power 'you beaut' station will be guaranteed to be a winner. The plodder who keeps turning the beam and looking around will have just as much chance, so please go to it and give it your best.

The RNARS activity contest will be of interest to many who are on the lookout for some of the many nautical type awards that are issued by the various marine clubs around the world. To have these stations very active over the contest period will please quite a few, including me.

Whilst you are all planning what to do with yourselves after the Christmas break, and after the activity of the Ross Hull contest is still giving you ideas of what you could have worked if you had gone up to so-and-so to operate from, why not plan ahead and find a spot to go for the Australia Day weekend that will enable you to work a large number of stations like yourself, all anxious to work another locator square and climb a little higher up the ladder towards the worked all VK locator squares award, if and when it gets off the ground

Please give this contest a go, many who find the long period of the Ross Hull contest too demanding, may find the 12 or 24 hour period of this contest more to your liking. I must once again apologise for an error in the results of the John Moyle field day contest. I listed VK2XEX as the winner of section "F" when, in fact, the winner was VK3XEX.

Rules for RNARS Activity Contest 1989

Dates: Saturday 15 November 1989 SSB.
Sunday 16 November 1989 CW.

Times: 0600 to 1800 GMT both days.

Bands: 3.5,7,14,21,28 MHz
SSB 3740, 7050, 14335, 21360, 28933 plus or minus 10 kHz.
CW 3520, 7020, 14052, 21052, 28052 plus or minus 10 kHz.

The contest is open to all amateur radio stations, but is mainly a naval club activity. It is open to all SWL's.

Stations Call 'CQ Naval' and give RST plus their RNARS/INORC/MF/MARAC number. Non-naval club members give RST plus number starting at 001

Separate logs and numbers to be submitted for SSB and CW sections, plus separate sheet for each band

Scoring: Contact with naval club stations = 10 points,
Contact with non-naval club stations = 1 point
A bonus of 10 points may be claimed for each first naval DXCC call area worked. These will be added at the end to make a multiplier
For the benefit of this activity, VE,VK,W,ZL & ZS call areas worked will count as separate countries

Certificates will be awarded as follows:

1. Top RNARS in each country CW & SSB.
2. Top RNARS QRP station (10 watts or

under) CW & SSB.
3 Top RNARS SWL in each country
4. Top NON RNARS participant.
5 Top NON RNARS SWL.

Logs: To be considered, logs are to be received by 31st December 1989

CW Logs to Ray James GM4CXM, 4 Pentland Place, Bearsen, Glasgow Strathclyde GU61 4JU

SSB Logs to Butch Pearson G0CBY, 107 Southeastern Road Ramsgate Kent CT11 9QD UK.

Rules For The 1989 Ross Hull Memorial Contest

Objects:

Licensed amateurs resident in Australia will endeavour to contact as many other licensed amateurs as possible using frequencies above 30MHz.

Frequency Bands:

All authorised amateur bands above 30MHz

Contest Period:

Between 0001 UTC December 23rd 1989 and 2359 UTC January 6th 1990.

Modes:

PHONE SSB, FM, CW

No terrestrial repeaters are to be used for scoring

No cross band contacts unless via an orbiting satellite

Satellite contacts are permitted if the Uplink is in a contest band.

Contacts within one's own Maidenhead locator square will not count for scoring.

Contest Exchange:

Report, serial number, and your Maidenhead locator square cypher

Score:

On 6m	2 points per contact.
On 2m	2 points per contact.
On 70cm	5 points per contact.
On 50cm	10 points per contact.
On 23cm	15 points per contact.
On 13cm	25 points per contact.
On 9cm	50 points per contact.
On 3cm	50 points per contact.

Total Score:

The total score will equal the number of points claimed. Plus 50 times the number of DIFFERENT locator squares worked, irrespective of bands

Repeat Contacts:

Stations may be worked once per band per UTC day

Operator:

Single operator only

Log Sheets:

The logs sheets must show

Date and time UTC Band used. Mode used. Station worked Report sent, serial number sent, locator square cypher, report received, serial number received, locator square cypher received. Points claimed.

Cover Sheet:

Operator's Name, Address, Callsign used. Equipment used. Location. Maidenhead number

Total number of points claimed. The number of different locator squares worked.

Location:

To add some interest during the contest period, an operator may operate from any other location for a period of up to 48 hours, provided details of the alternative location are entered in the log and cover sheet.

Awards:

Certificates will be awarded to the highest scoring station in each Maidenhead locator FIELD. The locator Fields will also be used to determine the winners outside Australia.

A perpetual trophy is awarded annually for competition between members of the Wireless Institute of Australia. The winners name is engraved on the trophy, and the winner also receives a suitable certificate.

The entrant with the highest overall score for the contest will be the winner and his/her division will hold the trophy for one year.

(Please note; Re the perpetual trophy being awarded to WIA members only. THIS DOES NOT MEAN THAT THE CONTEST IS FOR WIA MEMBERS ONLY). Any licensed amateur may enter this contest.

Participation Certificates:

Please indicate on the entry cover sheet and enclose a SASE (at least 180x150) if a participation certificate is required.

Post Your Entry To:

Federal contest manager, C F Beech VK7BC, 37 Nobelius Drive, Legana, Tasmania 7277.

Entries must be postmarked no later than 1st February 1990.

Rules For A National VHF/UHF Field Day Contest

Objects:

To promote the portable operation of amateur stations using the VHF and UHF bands.

Contest Period:

27th January 1990 - 28th January 1990. Times 0200 UTC Saturday until 0159 UTC Sunday

Mode:

Any mode within the terms of your licence.

Sections:

Section "A" Any continuous 12 hour period.

Section "B" Full 24 hours.

Categories:

(A) Single operator, single band. One person performs all station functions.

(B) Single operator, all band. One person performs all station functions.

(C) Multi operator; those stations using more than one person for operators, loggers, spotters etc.

(D) Home station, all band, one person performs all station functions.

Contest Exchange:

Signal report RS/RST Serial number commencing with 001, Maidenhead locator square number to fourth figure, ie QE38

Scoring: Two points for 50/144 MHz contacts.

Four points per contact on 432MHz.

Six points per contact above 432MHz

Contacts between portable field day stations count double points.

Home stations half score. ie One point on 50/144, two on 432 etc.

Multipliers:

The total number of different grid squares on each band.

Final Score:

Multiply the total number of contact points by the total number of multipliers.

Repeaters:

The use of repeaters is not allowed for scoring purposes

Repeat Contacts:

To generate activity, a station may be worked every four hours.

Location:

A station must remain at one location during the contest period except as previously specified

Power Supplies:

Any type of power supply may be used, including "mains power"

Awards:

To the highest scorer in each section, for each Maidenhead locator field

To the highest scoring club station in each locator field.

Front Sheet:

This must contain, name of operator/s, callsign, location, section entered, equipment used. A signed statement that the rules and spirit of the contest have been observed.

If the operator requires a participation certificate, please include a large SASE for [illegible]

Entries To:

F Beech VK7BC, Federal Contest Manager, 37 Nobelius Drive, Legana, Tasmania 7277. Entries must be postmarked no later than February 28th 1990. **ar**

AWARDS

KEN GOTT VK3AJU FEDERAL AWARDS MANAGER
38A LANSDOWNE ROAD ST KILDA VIC 3183

Who's for a VK Grid Square Award? Ideas Welcomed

While I will not reach for that cliche, "a ground swell of opinion", I definitely sense a feeling among WIA members that the time has come to introduce a new award based on Maidenhead Locator numbers, alias the grid square system.

In fact, I intimated to the 53rd Annual WIA Convention in Melbourne last April that as soon as the WIA Antarctic Award was launched (see AR, June 1989) that I would turn my attention to a grid square award (let's call it GSA). The idea was to have the GSA in place by the end of 1989.

I have submitted draft rules for the WIA GSA to the Federal Executive meeting on October 20-21, but without expecting the matter to be finalised then, or even wishing it to be. Apart from uncertainties posed by the airlines dispute, the executive needs time to ponder the proposals, and I would like as many WIA members as possible to be involved in defining the concept of the award and in framing the eventual rules.

If you are interested in having a say, please send me a SASE (10 x 23 cm or larger) and I will mail you a copy of the draft rules submitted to the WIA Federal Executive. I'm still hoping to have the rules approved by Federal Executive by end-1989, but even if the matter passes into 1990, the start-up date for the GSA could still be Dec 31, 1989. In the meantime you might like to share some of my thoughts, problems, dilemmas, and uncertainties which arose in drafting the rules.

HF, VHF, UHF, and so on

Most of those who have written or spoken to me about the need for a GSA have been VHF/UHF operators. Propagation characteristics on these bands make the Maidenhead system attractive to these operators, apart from the fact that the revamped Ross Hull Memorial Contest makes use of the Maidenhead numbers. For these and other reasons, it is apparent that VHF/UHF operators are generally more familiar with the grid square system than are the rest of us.

I am proposing, however, that the GSA be open to all amateurs on all bands, and on as uniform a basis as possible. The basic idea will be to contact stations in 100 different grid squares, with this rule applying both to local and DX operators and, to the extent practicable, to all bands (but see below).

Ending the distinction between local and DX stations is novel. For example, the rules of the WIA's most popular award, the WAVKCA, calls for VKs to make 88 QSOs while DX amateurs need only 22.

However, just QSOs with 100 different grid squares? Or should there be an obligation to contact at least one/two/three or whatever stations in each VK call area? Your ideas would be welcome. And if you favour call area quotas, should these be the same for local and DX stations?

I am suggesting that the 100 QSO rule apply to all bands (and modes) from 1.8 MHz to 144 MHz.

What About SHF and EHF?

But what after that? What figure should be set for 70 cm? And for 1.2 GHz? And for the SHF (super) and EHF (extra) bands? In these realms, I'll be relying heavily on advice from others.

In fact, I'm open to persuasion on almost everything except the verification principle to be used.

WIA awards generally require proof of QSOs in the form of QSL cards. These need not be submitted, but in their absence there must be a list of cards certified by two other amateurs to the effect that they have personally inspected the cards on the list and that the list is accurate in all details.

However, for "one-off" WIA awards, such as those for our 75th and 80th anniversaries (see September AR), cards are not necessary, merely a certification by two other amateurs that the QSOs are in the applicant's log book.

Somebody suggested to me that the GSA should dispense even with this simple requirement, and that it be issued simply on an applicant's claim that he had worked stations in a given number of grid squares.

This would certainly simplify my work as Federal Awards Manager. I would simply put a pile of signed certificates near the door of the Federal WIA office and anybody who considered himself/herself qualified could walk in and take one home and fill in his/her name and callsign. (For non-WIA members, there would also be a collection box into which they could put their $5 fee.)

However, I hardly see the Federal Executive agreeing to lapse the integrity of a WIA award to that extent. I am suggesting that we use the certified log extract principle (no cards not needed).

Portable Operations

I have also written into the draft rules a provision that an amateur can work portable from a "rare" grid square and count a QSO from it, provided that the contact is with a station in his home QTH.

However it has been suggested that operators are unlikely to set up portable stations merely to make one QSO, and that contacts with stations in grid squares, other than the home one, should count too.

This opens a can of worms - apart from a situation in which a station makes 100 QSOs from a portable QTH and so qualifies for the GSA under the portable callsign.

However, I don't think it appropriate to allow a mix of QSOs from home and portable QTHs to count (apart from the one exception mentioned above).

Once again, I'm open to persuasion.

If at all possible, I want to avoid rules which involve measuring distances between grid squares. A grid square is a grid square, irrespective of whether two squares abut or, are thousands of km apart.

Finally, all comments are welcome, irrespective of whether you want to look at the draft rules.

Corrections

Typographical errors again made nonsense of some items in last month's Awards Column.

The Major Mitchell, National Parks, Natural History, Power Valley (10/10) and Wombat Awards listed as "Missing, Presumed Killed" are (or were) issued by VK3 groups, not VK4.

The cost of the USSR Award, Trophy Ukraine, is not $3.00 or 60 IRCs as reported, but $30.00 or 60 IRCs. Repeat, $30.00 or 60 IRCs.

Finally, Bill Vogel, who looks after the 10/10 Festival City and VIPM Award is VK5NVW, repeat VK5NVW, not a VK4. Apologies for the error, Bill.

Awards Issued Recently (WAVKCA)

1667	Zdenik Mensik	OK1ZL
1668	Ryochi Kirano	JA6EFT

Continued on page 49

KENWOOD

KNOCKOUT DUAL-BAND DUO!

TM-731A

The Kenwood TM-731A redefines the original Kenwood term "dual bander". The wide range of innovative features include a dual watch function, selectable full duplex operation, automatic band change, 30 memory channels, large dual LCD displays, programmable scanning, and 50 watts of output on 144 MHz and 35 watts on 430 MHz.

The optional RC-10 multi-function handset remote controller is also available, making the TM-731A even more enjoyable to operate.

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- Large amber multi-function LCD display for best visibility in sunlight or after dark
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Features:

- Dual watch function allows you to receive both VHF and UHF bands at the same time
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- Large multi-function LCD display provides excellent visibility
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- Various scan modes are provided including band scan programmable scan, memory and dual scan
- Auto battery saving circuit increases battery life
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The TH-75A combines the 2m and 70cm bands together into one compact, feature-filled hand-held package. Large dual LCD displays, dual watch, selectable full duplex operation, tone alert and many additional features make this dual band HT different from the rest.

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POUNDING BRASS

GILBERT GRIFFITH VK3CQ
7 CHURCH STREET BRIGHT 3741

Congratulations Maggie VK3CFI (QRP138) on your win in the John Moyle Memorial National Field Day 1989 contest. (Maggie phoned me with this info). Also congratulations on your new Australian citizenship on 21 August (info courtesy Lo-Key). Your participation is an asset for the WIA, the CW Operators QRP Club, Morse Code Operation, and now Australia, too. Welcome! Your example will put me back into the field day next year in section B for sure, and I hope a few other Morsiacs will follow, and make their own effort to go portable for this important contest. For your efforts, may the rewards be great.

Some of you may have seen the news about a severe storm which hit the north east on 11 September; winds of up to 160kph were reported, and the Albury power station suffered an explosive failure. My own 55-foot tower folded at the 25-foot level, after an unidentified missile cut one of the guy ropes (the one on the windward side, unfortunately). I spent the following week trying to extract 20 and two-metre yagis from assorted trees without completely wrecking them. It really is amazing how much they will take. Wire dipoles are less robust and all need replacing. Needless to say, retrieving the mess from 30 feet up in the trees was the most dangerous part of the whole exercise, and I was relieved to climb down for the final time. I would like to hear from any other amateurs in the area who have had storm damage, with the intention of designing a storm-proof system.

"No-code entry in USA?

A *Morseum Magnificat* reader in South Africa runs an amateur Morse class. After reading the debate about the future of Morse in recent British and American magazines, and seeing the results of readership surveys, he tells me his students are convinced the test will be abolished shortly in both countries. They think that other countries will follow suit, and they are wondering whether it's worthwhile continuing with their classes.

There certainly have been a lot of words generated on the subject, but at the present time it's all wishful thinking based on a misunderstanding! The heated debate in the USA relates to various proposals that there should be a 'no-code entry' into amateur radio for operation on certain frequencies *above 30MHz*, something we have had in Britain for years! In CQ magazine, June 1989, Ed Judge W5TOO reports on the conclusions of the ARRL committee specially set up to study the issues and make recommendations to the ARRL board of directors.

The committee recommended that the present USA Technician class be renamed 'Technician Plus' and that a new code-free 'Technician' licence be created with all operating privileges above 30MHz, including 50MHz but excepting 2m, where only digital operation between 144.9 and 145.1MHz would be allowed. Upgrading to the new Technician Plus grade would be effected by passing a Morse test of 5wpm, giving access to the 80, 40, 15 and 10m bands, exactly as with present Technician grade.

Using virtually the same argument as the RSGB, the ARRL thinks that under future pressure, the greatest strength of amateur radio will be in numbers. W5TOO comments that bright young people, 'computer literate, technically adept and creative' are willing to prove their competence in areas of regulations and technical knowledge, but are unwilling to submit to what they view as a non-relevant, outmoded and unreasonable requirement - the Morse code.

During the Committee proceedings, Dave Sumner K1ZZ, Executive Vice-President of ARRL, advised that the League estimated a growth rate in new licensees - with a no-code licence - of 12%, provided they worked hard at recruiting. But it was agreed there would not be the flood of new people some seemed to fear. ARRL will now decide if it wishes to petition the FCC for an amendment to the amateur regulations to permit code-free entry as recommended by the committee.

By contrast . . .

Undoubtedly national societies everywhere are attempting to do what they think is best for amateur radio, but it is interesting to compare their different approaches.

On the basis of the American argument, the fact that the UK has a code-free licence for frequencies of 50MHz and above should surely mean that we are already successfully recruiting our fair share of 'computer literate, technically adept and creative bright young people'. Yet the RSGB, in its own efforts to bring these same elusive folk into amateur radio, is proposing a new novice licence to include a 5wpm Morse test which, in the States, is thought to keep them away!

While their concern on behalf of amateur radio is to be applauded, one sometimes wonders if the societies are on the wrong track. I was particularly struck by the comment of an industry spokesman at the Miami Hamfest, reported by W5TOO. "If you stood at the entrance to the World's Fair and handed out blank Extra Class tickets, maybe one hundredth of one percent would ever be used." W5TOO also commented: "We all love amateur radio . . . But the sad fact is, in the eyes of a public accustomed to supersonic jet travel and intercontinental long-distance calls, amateur radio has lost its magic."

It seems more than likely that the major effort of abandoning the Morse test completely would be inside amateur radio, resulting in greater use of the HF bands by existing amateurs, rather than the attraction of more newcomers to the hobby. Whatever the eventual result, however, the Morse test is unlikely to be dropped as a qualification for amateur operation up to 30MHz until it is no longer a requirement under the international radio regulations."

(From Tony Smith G4FAI 'Morse Report', Amateur Radio Sept '89.)

On a final note this month, I had hoped to complete the assembly of a new kit from C M Howes Communications (UK), but rebuilding my antenna system is still in progress. I hope to have a report on the ASL5 audio filters for you next month instead. It is an audio filter for external use with a communications receiver. It gives improved selectivity for all speech modes and CW reception with most popular makes and models of receiver/transceiver. It offers both a narrow band CW filter, and a sharp rolloff on SSB, offering tighter filtering than most crystal filters. ar

From page 47

1669	Warren W Edwards	WD6HDF
1770	Yoshio Tada	JS1QHO
1771	Don J Milner	ZS6AQS
1772	Hiroyuki Wakabashi	JH4GNE
1773	Shizuki Anezaki	JHØLME
1774	Hiroshi Higuchi	JA3EQO
1775	Yokichi Suzuki	JF7DZA
1776	Gianni Galli	I4CSP
1777	Akihiko Endo	JR4NUN
1778	William Kling	KI6PG
1779	Charles A Brown	N5CB
1780	Frank E Murphy	KI4FW
1781	Ake Berndtson	OH4OJ
1782	Shoji Okuno	JA3BVJ
1783	Ikusuke Miyazaki	JA6TMU
1784	Henry J Kiernan	KF2O
1785	Fabio Lava	HB9AUS
1786	A J H Hales	G4NEX
1787	Classe Bergman	SM3CSK ar

AMSAT

Maurie Hooper VK5EA
11 Richland Road Newton SA 5074

National Coordinator
Graham Ratcliff VK5AGR

Information Nets

AMSAT Australia
Control VK5AGR
Amateur check in, 0945 UTC Sunday
Bulletin commences: 1000 UTC
Primary frequency: 3.685 MHz
Secondary frequency: 7.064 MHz

AMSAT SW Pacific
2200 UTC Saturday, 14.282 MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net. This information is also included on some WIA Divisional Broadcasts.

AMSAT Australia Newsletter and Computer Software

The excellent AMSAT Australia Newsletter is published monthly by Graham VK5AGR on behalf of AMSAT Australia and now has about 270 subscribers. Should you also wish to subscribe, send a cheque for $20 payable to AMSAT Australia addressed as follows:

AMSAT Australia, GPO Box 2141, Adelaide 5001

The Newsletter provides the latest news items on all satellite activities and is a "must" for all those seriously interested in amateur satellites. Graham also provides a Software Service in respect to general satellite programs made available to him from various sources. To make use of this service, send Graham a blank formatted disk and a nominal donation of $10 per item to AMSAT Australia together with sufficient funds to cover return postage. To obtain details of the programs available and other AMSAT Australia services send a SASE to Graham.

MICROSAT/UOSAT D & E Launch Delay

(from AMSAT-NA News Service)

Special AMSAT/MICROSAT Bulletin - September 29, 1989

Official word received today indicates that Ariane-4 V35 launch of the four AMSAT Microsat satellites and the two UoSAT satellites plus the primary Spot-2 satellite will be delayed at least four weeks from the previously announced November 10th date.

The statement received from Paris states. "Pyro initiators in the vehicle equipment bay atop the third stage in the Ariane 4 launchers for the V34, V35 and V36 missions are all exhibiting characteristics that are sufficiently out of specification that a joint decision by Intelsat and Arianespace was taken to scrub the V34 launch scheduled for October 5th and postpone it for a minimum of four weeks. The pyro initiators cause separation of the payloads from the launcher."

Since all three launchers have the same problem, a slip in the schedule for the first will cause a delay for all the other missions. In addition, the V35 launch of Spot-2 has orbital insertion geometry constraints to properly phase the new satellite with Spot-1 which may cause additional delays in launching the MICROSAT/UOSAT payloads.

All the MICROSAT test and ground support equipment had already been shipped to Kourou, and the satellites were due to accompany the AMSAT launch vehicle integration crew who were to have flown down today. Needless to say, all these transportation plans have been cancelled. The time gained as a result of the slip will be used to do additional system level and software testing on the satellites.

UOSAT D & E Ready For Launch

(from AMSAT-NA News Service, 30 September)

UOSAT D & E Status Report on Environmental Tests

UOSAT D and UOSAT E were removed from the thermal vacuum chamber at the UK Royal Aerospace Establishment (RAE) late in the afternoon on Monday, after completing four hot and three cold cycles. The satellites' internal temperatures had been cycled between -30 and +50 degrees C, and all systems were operated over this temperature range.

During the second cold cycle (Saturday night to Sunday morning), all systems were turned off and allowed to stabilize at -20. They were then re-started one by one, confirming that the satellites can be started after a prolonged cold period.

These thermal vacuum tests provided us with our first long period of UOSAT D & E operations, and we were able to exercise all systems during the 5-day tests. The number of alternative data paths and graceful failure modes which have been built into UOSAT D & E make comprehensive check-out impossible in the limited time available before launch, but we have used all of the primary systems and paths.

Both spacecraft performed well throughout the temperature cycling. In particular, the 1802 On-Board Computers, the Z80 "SPARE computers" and the 80C186 PACSAT Communications Experiment (PCE) experienced no difficulties. In a last minute fit of "jitters" we installed one of our own telemetry temperature sensors directly on the 80C186 in the PCE, and were able to confirm that it runs consistently 10 degrees hotter than its surroundings. There was some fear that this processor in its 68-pin "grid-array" package might develop into an undesirable "hot spot", but this did not occur.

The RF systems - including the 10W power amplifier for PACSAT experiments with very small groundstations - operated without difficulties throughout the tests. Both the temperature cycling and the prolonged operational test period did identify some minor problems in each satellite. The navigation magnetometers seem to be temperature sensitive (but they function perfectly at the expected operational temperature), and the overcurrent protection trips on some of the power switches trip unnecessarily at low temperatures. These problems are now being investigated at the University of Surrey prior to shipping the two satellites to Kourou.

Today (Wednesday) UOSAT-D travelled to Portsmouth for spin balancing, while UOSAT E was de-Gaussed and magnetically tested back at RAE. Tomorrow the positions switch, and on Friday the final shake tests will take place. The UoSAT team is operating a 24 hour/day schedule to conduct these tests each day and to exercise and prepare the satellites for the next test each night.

OSCAR-10 Transponder Schedule

Please DO NOT use the Mode-B Transponder on OSCAR-10 until at least the middle of November 1989 as the Beacon and Transponder signals began FMing during the last weeks of August. An estimate of AO-10's attitude on

02Oct89 is LON 49 degrees LAT -22 degrees which equates to only 6% solar panel illumination. By the second or third week in November the solar panel illumination should be greater than 70% and should once again support Transponder operations.

AMSAT MICROSATS Successfully Complete All Environmental Testing

AMSAT-NA News Service 24Sep89

This week all four of the AMSAT MICROSATs (PACSAT, LUSAT, DOVE, and WEBERSAT) completed the necessary environmental tests, that is, thermal vacuum and vibration tests with "flying colours". These successful tests now mean the MICROSATs are now "certified" to fly aboard the Ariane IV launch vehicle.

On Sunday, Sept 17th the MICROSATs completed thermal vacuum testing at the Martin-Marietta Space Simulation Laboratory (SSL) in Denver, CO. Only minor hardware "anomalies" were found at very low temperatures of -25 degrees C, all of these small problems were quickly corrected on Monday by the MICROSAFT Test Team. On Wednesday of this week, each of the MICROSATs were subjected to several vibration tests, which simulate the vibrations they will "feel" when they ride aboard the launch vehicle. The MICROSATs were "shaken" in all three axes to the "acceptance" levels specified by Arianespace in their all important document known as the "Interface Control Document". The "shake" test was again performed at the Martin-Marietta facility in a building known as the Acoustic Vibration Laboratory (AVL). Also completed this week was the pyrotechnic "shock" test.

In this test a "live" ordnance device was ignited, this very complicated and dangerous device is used to cut the "bolt" which holds a MICROSAFT to the separation plate on the Ariane IV rocket.

In this test, the "engineering" test model was used, and not a real MICROSAFT spacecraft. The "engineering" model received a jolt of 46 g's for about 3 milliseconds! Despite this big acceleration, the MICROSAFT structure was able to handle the shock without any problem.

As of Friday, Sept 22nd, all these environmental tests were completed, the following Friday, Sept 29th, the MICROSATs and the AMSAT Launch Team will travel to Kourou, French Guiana, to start the launch campaign on Oct 2nd.

The first AMSAT Launch Team to arrive next week in Kourou will consist of the following individuals: Jan King (W3GEY), Bob McGwier (N4HY), Jeff Zerr, Harold Price (NK6K), Lyle Johnson (WA7GXD) of TAPR, Charlie Bonsall of Weber State University, Jose Machao (LU7JCN) of AMSAT Argentina, and Junior de Castro (PY2BJO) of AMSAT Brazil.

This team of AMSAT volunteers will perform the next major task of integrating the MICROSATs onto the Ariane Small Auxiliary (ASAP) structure.

An Update On Cross-Mode B/ Mode S Operational Frequencies On AO-13

AMSAT-NA New Service 24Sep89

In early August, a simple software change on OSCAR-13 made it possible to turn off the Mode S beacon for normal transponder operation, and one of the surprises which became evident to Mode S users was the appearance of Mode B signals on the Mode S downlink passband. In other words, it is now possible to make "cross-mode" contacts between Mode B and Mode S. Bill McCaa (KORZ) has completed the following 'revised' table concerning this new mode of operation on OSCAR-13

Mode S Uplink:	435 602 to 435 638 MHz
Mode B Uplink:	435 480 to 435 516 MHz
Mode S Downlink.	2400 711 to 2400 747 MHz
Mode B Downlink	145 918 to 145 882 MHz

Because of the cross-mode operations are now possible, Mode B users should be aware of the potential for QRM-ing Mode S users. The best suggestion for Mode B users to avoid QRM-ing Mode S stations is for the Mode B stations to use QRP power between 435.480 and 435.516 MHz

Satellite Activity for July/August 1989

1. Launches.

The following launching announcements have been received:

Int'l Satellite Number		Date	Nation	Period min	Apg km	Prg km	Inc deg	
1989-								
059A	COSMOS 2034	Jul 25	USSR	105.0	1026	988	82.9	
060A	COSMOS 2035	Aug 02	USSR	88.8	268	191	82 6	
061A	STS 28	Aug 08	USA	90.5	317	314	56.9	
061B	USA 40	Aug 08	USA					
061C	USA 41	Aug 08	USA					
062A	TV-SAT 2	Aug 08	Germany		1429 9	35785	35544	0.2
062B	HIPPARCOS	Aug 08	Europe	628.9	35632	223	7 0	
063A	RESURS-F4	Aug 15	USSR	89 0	258	192	82 3	
064A	USA 42	Aug 18	USA					
065A	COSMOS 2036	Aug 22	USSR	89 6	273	248	62 8	
066A	PROGRESS M	Aug 23	USSR	88.5	235	191	51 6	

2. Returns

During the period eighty nine objects decayed including the following satellites.

1965-007A	OSO 2	Aug 09
1976-085A	COSMOS 851	Aug 05
1980-037A	COSMOS 1179	Jul 18
1987-064A	COSMOS 1870	Jul 29
1989-054A	COSMOS 2030	Jul 29
1989-055A	RESERS-F 3	Aug 08
1989-057A	COSMOS 2032	Aug 03
1989-060A	COSMOS 2035	Aug 16
1989-061A	STS 28	Aug 13

3. Notes

1989-061A STS 28 was launched by the United States Department of Defense. USA 40 and USA 41 were deployed from STS 28.

1989-062A TV-SAT 2 and 1989-062B HIPPARCOS were launched from the Kourou Space Center, French Guiana by an Ariane 44 LP rocket.

nr

INTRUDER WATCH

Gordon Loveday VK4KAL Federal Intruder Watch Co-ordinator Rubyvale 4702

As I conclude the summary for Region 3 Co-ord, I find it a good time to review those logs that arrived at my QTH - far too few this month. I hope it is not a sign for the future. Late arrivals will be dealt with in next month's summary. I must mention the effort put in by Karl VK6XW; he has "filled' the idea put forward by the DOTC and broadcast by Bill Roper VK3ARZ over the WIA Divisional News. Karl has concentrated his observations to a small section of 14MHz and come up with some very interesting and helpful information. His 30-odd loggings of one intruder should please DOTC and demonstrate to it that we do take notice of its suggestions. I would urge ALL observers to concentrate on small sections of the bands in which they work most frequently. I would like to suggest about 100kHz first up. In this way, you would become an expert at picking ANY NEW intruder, and become familiar with the present ones in that section.

The Radio Tele Station on 14.048 has shifted a bit to dodge another F1B intruder. He is now on USB instead of AM, but using N0N when no traffic. From the bearing given by the observer (290 deg) it would suggest the location to be in INDONESIA

Some state co-ords are not doing their job very well at all. In the 10 years I've been co-ord in VK4, my monthly time has been only about three hours. If those co-ords are not prepared to put that amount of time into a hobby to help their fellow operators, I suggest they resign now. The position is NOT restricted to male operators; I'm sure the YL or XYL operators could do the job just as well.

Remember, your licence is of no use without frequencies.

Many carriers N0N have been reported right across the 20-metre band daily, for periods up to one hour with 14250 kHz being a 24-hour continuous. The "Woodpecker" has been observed on 14 and 21MHz bands.

We have the usual CBers on the WHOLE of 10 metres at considerable strength. VK6RO alone logged 2259 intrusions from our near north.

Karl VK6XW has submitted an informative set of observations of VRQ on 14069.3 to 14073+ segment. He has logged VRQ 30 times during period 22/7 to 27/8, complete with notes. This is what DOTC was talking about. Thanks Karl, much appreciated.

VK6RO

Welcome to Graham VK6RO on his appointment as Co-ord for his state. "We" in the monitoring service are still getting far too many RTTY reports with no frequency shifts recorded Observers, PLEASE check your modes tape for a clear explanation of how to achieve this . . if you do not have a tape, send me a blank C60, these are free, and post free.

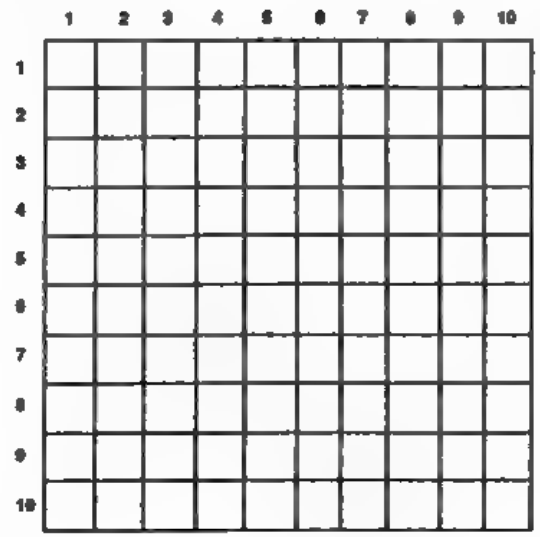
With the increase of propagation towards the year end - a timely reminder ... Guard our bands against intruders; it gets harder each year. Join the Intruder Watch Here in VK, as in most other countries, we depend on a very small band of dedicated observers who, in fact, sacrifice valuable amateur on-air time by just listening and recording (both on paper and cassette) intruders into our bands . . . Yes, those used by non-reporting operators . . . Bands which have cost us a lot of dedicated voluntary time and money to get for the radio amateur. If you are a recently licensed amateur, remember that the amateur fraternity all over the world contributed money, in small and large sums, to their respective national organisations to enable the IARU to be at the various World Administrative Radio Conferences when they fell due. Have you made a donation for the 1992 conference? Thanks to the groundwork done by our own WIA volunteers, Amateur Radio is enjoying the new frequencies of 10, 18 and 24 MHz. Frequencies causing much bother are 14.038 and 14.044/48. (Check them out and let me have your findings, please). 73, 'till next month.

Morseword No 32

Solution on page 59

Across
1 Melt
2 Auction
3 Powder
4 Obstacle
5 Annoy
6 Colour of a horse
7 Foolish
8 Jot
9 Small children
10 Goes in haste

Down
1 Dog
2 Replete
3 Hurried
4 Blemish
5 Massage
6 Willing
7 Church dwelling
8 Barrels
9 Rips
10 Part of a stair



Round the world QSL delivery by cyclist James Dawton. Photo shows James handling a card from VK5YD to Maunce G4BRE at Crawley, Sussex. G3YAB looks on as GØIMC points to this unusual delivery For the full story, see 'Pedal Power' AR October 89 p59. Submitted by VHA McBratney VK5YD.

Condensed Intruder summary for Aug/Sept

Freq	Date	UTC	Log X	Mode	ID	Comments
14023	1508+	0710+	23	F1b	UMS	Often heard 8 hours straight
14025	2108	0945		A3J		THAI Fishing Boats/DARWIN HBR
14038.5	1009	1059		F1b		RTTY RYs idling
14046.5	2309	mni	4	F1b		Pos 3rd shift mod to 14047.5
14048	1808	mni	31	USB		Rad tel/Chin accent/24 hours daily
Also changes freq to 14044						
14065	1908	2215+		A3e		B/caster (345 deg 8HA) x mod
14070	2409	0929	2	A1a	VBX	VPO de VBX QSV K
14086	2409	1026	2	A1a	NPO	CPQ de NPO QSV K
14087	2309	0200			F1b	RTTY 2KHz shift
14100	2309	0930	2	A1a	NZB	ZBK de NZB Traffic
14119.5	mni	mni	13	F1b	UVC?	3rd Cyrillic shift 12 hrs on air
14123.5	2308+	mni	20	mni		
14127						Suspect European no ID in 8 hrs
14131.2	2408+	mni	4	F1b/F1CW		F1CW mxd cypher 6 hrs on air
14139.5	2309+	mni	7	F1b/N0N		Not UMS. 200/67 3rd shift 8 hrs
14140.5	238/179	mni	12	mni	UMS	5ltr/5fig. Moscow Nav Radio
Large amt TFC HS Morse abt 50wpm callsign clearly observed						
14168.5	0509+	mni	6	F1b	USWZ	Radio ROSTOV ?? USSR
14199.5	2308	mni	10	F1b		
14200.5	2808	1155	3	wide		
				F1b		Also F1CW 400+ KHz shift 8 hrs
14202.5	1109+	mni	6	F1b/A1a		RTTY Russian ltrs Q code used
14215	0409	1000+	4	A1a	2UH	FF9 de 2UH tfc out
18099.5	mni	mni		A1a	???	5 fig cypher UMS-type sending
21032.5	dly	mni	29	F1b/A1a	UMS	ID in A2 10 hrs daily
21068/9	mni	mni		R7b		18.5 KHz wide
21072	1708	1130		A1a		5ltr groups (315 deg 8HA)
21116	mni	mni		A1a	CQ5	Chinese Dip Service Beijing
21181.4	2809	0642		F1b		RTTY 1.7 KHz shift
28151	0608	0240		A3j		B/cast either Chin or Japan
28279.4	2809	0607/31		A5		TV carrier 50Hz (10deg E, VK4KAL)
28574.5	1509+	1313	5	A3e		B/cast European/USSR ????
28576.1	2309	1104+		A3e		B/cast USSR news M/F

Many CB intruders were observed in the 28-30MHz sector, - the final count will be interesting. This listing is of those stations most observed during September, for inclusion in AR.

Logs supplied by: VKs 2PS, 2AAB, 2EYI, 3XB, 4BG, 41S, 4ADY, 4AKX, 4BHJ, 4BTW, 4BXC, 4EKA, 4KAL, 4MWZ, 4VJT, 5GZ, 5TL, 6RO, 6XW, 8HA. **ar**

New Look AR Magazine

This issue of Amateur Radio magazine is special (but then, isn't every issue of this magazine so special that all members keep it on their bookshelves for years, and refer to it again and again?)

Did you notice that this issue of your favorite radio journal looks somewhat different, or hadn't you noticed in the rush to read HAMADS?

Quite apart from the usual monthly magazine, jam-packed with lots of news, technical articles and general reading, this November 1989 issue of **your** magazine is something special.

You may have noticed last month that the index page, and the WIA Directories, looked different. This month it is the front cover masthead which has been changed, as well as the layout of the internal pages. Not dramatic changes, but in keeping with our policy of continuing to seek ways and means of improving your magazine for you.

Many of the presentation changes have come about as a result of a positive response to our requests from Mark Jamieson and his co-operative team at Redfords Media.

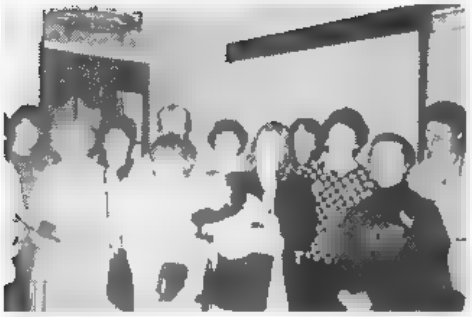
This issue is also special in that it marks the completion of 20 years of VHF column notes by Eric Jamieson VK5LP. Eric's first VHF column for Amateur Radio magazine appeared in the December 1969 issue of our journal. Just think about that for a moment. That's quite an effort, and is an outstanding record for a regular contributing columnist.

And in this "new look" November issue of Amateur Radio, we announce details of a fantastic new competition, available to **WIA members only**, as part of the WIA 80 anniversary celebrations. A chance for members to win a fabulous IC-900A transceiver donated **by ICOM Australia Pty. Ltd.**, one of Amateur Radio magazine's major advertisers. Enjoy the hours of reading in this special November 1989 issue of your magazine (naturally, after you have first eagerly perused HAMADS).

ar

ALARA

Joy Collis VK2EBX
PO Box 22 Yeoval 2868



VK5 ALARA Ladies luncheon held on 23 July. L to R: (out of picture) Lorraine VK5LM; Vicki VK5FK, Joy VK5YJ; Pauline Koen; Judy VK5BYL; Meg VK5AOV (behind Judy); Denise VK5YL, Grace Taylor, Christine VK5CTY; Jenny VK5ANW; Janet VK5NEI and Maria VK5BMT.

ALARA Contest

The eighth ALARA contest will be held on Saturday 11 November commencing at 0002 UTC and ending at 2359 UTC. We cordially invite all licensed operators and SWLs to join us.

Contacts made with members during the contest do count towards the ALARA award, a point to remember for those interested in obtaining this unique certificate.

Hope we can make this the best contest yet!

Logs: It is disappointing if, after a contest, your log has to be rejected for any reason; so, please check before forwarding to ensure that it is signed, has your full name, address and callsign and is legible. (No carbon copies, please). Single log entry (combined CW and SSB), but novice YLs entering for the Mrs Florence McKenzie Trophy should indicate their CW score separately.

Logs must show date/time UTC, band, mode, callsign worked, report and serial numbers sent and received, name of operator of station worked and points claimed.

They should reach the contest manager by 31st December 1989.

Contest Manager: Mrs Marilyn Syme VK3DMS. PO Box 91, Irymple, Victoria, 3498.

ALARAMEET 1990

The response to the ALARAMEET survey conducted recently has been enthusiastic, with a total of 35 adults indicating they will be attending, and 11 adults and one child hoping to be there.

Although there are still over 10 months before the Dubbo get-together, it is of great assistance to the organisers to have an early indication of numbers in order to plan booking of accommodation etc.

Anyone interested, please contact Maria VK5BMT for further details.

Bits and Pieces

Annie DF2SL informs us that a YL CW Activity Day is held on 15th of each month. Look for contacts on the hour on 14.050 MHz.

The total number of contacts made during ALARA's operation of VI88WIA last year were 1128 CW and 2102 SSB. Bureau QSLs are still being received, and will be dealt with as they come to hand.

VK5 Birthday Luncheon

The VK5 birthday luncheon was held on 23rd July at the Royal Coach Motor Inn, Kent Town. An enjoyable day was had by all who attended.

New Members

Welcome to new members: Janet VK5NEI, Jill ZL2BHJ and SWL Kathy Armstrong, daughter of Christine ZL2BQW.

Kathy, who had her seventh birthday in September, is our youngest member, also a member of WARO, and already quite deft with a soldering iron. We are very happy to have this young lady in ALARA.

All the best until next month, 73/33. **ar**

QSLs

Ken Matchett VK3TL Hon Curator
WIA QSL Collection PO Box 1 Seville Vic 3139

From Greenland

The history of Greenland began in the year 982 when the Norwegian, Eric the Red sailed from Iceland to found Greenland. It is said that he named it so in order to persuade people to colonise the area. The country was a Danish colony from the year 1261 to 1953 when, in the latter year it became an integral part of Denmark sending representatives to the Danish Parliament.

Before World War 2, American personnel in Greenland used the prefix NX. In *The Radio Amateur's Handbook* of 1936 a footnote under a list of International Prefixes reads "There are, in addition, certain prefixes not officially assigned which are at present used by amateurs of several countries. Some of these are NX Greenland, NY Canal Zone."

This prefix was quickly followed by the OX prefix, both prefixes being used for a short time before the outbreak of war. In the post-war DXCC listings only the OX prefix appears.

The station NX1XL operated out of Greenland in 1933, being the station associated with the University of Michigan's Expedition to Greenland. In 1936, the station NX2Z was the only permanent one in the country. It acted as a land station for the 1935 Danish Polar Expedition.

We see the first listing of OX for Greenland in 1937. The call-sign allocation by the International Telecommunications Convention (supplemented by provisional action of the Berne Bureau) had included the prefix block OUA - OZZ for Denmark and so both the Faroes Islands and Greenland (both being Danish territories) could be given the OY and OX prefixes.

In fact, during the pre-war era some confusion existed over the prefixes used for these two countries. In the March 1936 edition of QST we read "The anomalous situation with regard to Greenland and the Faroes has been cleared up by the assignment by the Danish Government of OX to Greenland and OY to the Faeroes. The latter, by the way, are considered part of Denmark, whereas Greenland is a Danish colony."

The WIA QSL collection contains only the prefixes OX3, OX4 AND OX5. These are probably the only OX prefixes issued to individual licencees. The prefix XP has also been allocated to Greenland. In the late 1960's a MARS station, XP1AA operated out of Thule, and XP1AR out of Sonderstrom. The OX3 prefix is issued to Greenland nationals whereas OX4 and OX5 have been taken up by US personnel in Greenland.

There was a time when only Greenland nationals were listed in the Call Book (probably for security reasons) but both are now listed albeit separately

The rare OX9 prefix was used for the first time in 1982 to commemorate the millenium of Eric the Red, the founder of Greenland The call OX9V was allocated to a radio club in the area in which the folk-hero is said to have settled.

Having quite a small population and a dearth of radio amateurs (a little over one hundred), Greenland has always been attractive to DX-hounds. The fact that it is one of only five DXCC countries in the evasive CQ DX Zone 40 also makes it a prize for WAZ certificate hunters.

OX5AT

This QSL dated July 1972 is from Thule, an American Air Base on the north-west side of Greenland following a QSO with the writer (when active from Nauru Republic as C21TL). The QSL together with its drawing of huskies and their sled shows a map of Greenland, a small star indicating the position of Thule Since most of us are used to looking at world maps based on the Mercator projection, we tend to think of Greenland as quite a large sub-continent. On the Mercator map, areas are exaggerated towards the poles and so the country looks as large as, if not larger, than Australia. In actual fact its area of approximately two and a quarter million square kilometres makes it a little less than the area of Western Australia Of this, only about an area a little more than half the size of Victoria is free of ice As will be seen from the map on the QSL card, most of the country lies within the Arctic Circle (represented by the dotted line)

Intermarriage between Danes and Eskimos has resulted in a vigorous mixed race of Greenlanders.

However, the days of the igloo and the kayak have almost gone except in small communities in certain locations on the east coast and in the Thule region where almost pure Eskimo people can still be found. It is interesting to note that although Greenland has been a Danish possession for many hundreds of years, Denmark did not take control of Thule until 1937.

This was because Thule had been in a distinctive position since its discovery by the explorer, Rasmussen who set up an independent type of local government which was respected by the Danish authorities.

By an agreement dated April 1941, the United States Government was given permission to set up military bases in Greenland. Today Thule is the base of an "early warning" radar facility

KG1AX

The alternative prefix KG1 (used by American personnel) appeared for the first time in ARRL Countries List in January 1956 (other KG prefixes at the time were KG4 Guantanamo Bay and KG6 Marianna Islands). It remained on DXCC country listings until 1965

The KG1AX QSL dated August 1956 was from an American based at Camp Tuto, which is situated east of Thule at the edge of the Greenland Continental Ice Cap.

It is this gigantic ice cap which covers most of the country rising to heights of an incredible ten thousand feet (approximately 3300 metres).

The ice sheet slopes towards the coast, regularly discharging icebergs which float out into the Atlantic. It was no doubt one of such icebergs which caused the White Star Liner *Titanic* to sink with its disastrous loss of life in April 1912.

Thanks

The Wireless Institute of Australia would like to express its thanks to the following for their contribution of QSL cards towards the Collection :-

(Supplementary List)

Frank VK2QL, Eddie VK8XX, John VK3WZ, Barry VK5BS, Jim VK9NS, Graham VK2FGI (ex VK3AOT), Vic VK5AGX, Lindsay VK5GZ.

Also to the friends and families of the following "silent keys" :-

Max Lindsay VK4HD (courtesy of John VK4PU), Joe Kilgariff VK5JT (courtesy of Lindsay VK5GZ)

DX QSL Contributors' Ladder

(See "AR" March 1989)

Herewith a list of contributors together with special QSLs that have kindly been donated to the WIA Collection (Supplementary List) :-

Jim VK9NS Prefixes new to the collection :- RO, CLO, CXO, XM3, TE32, 5N6, ZY5, ZF8, YX5, JY7, BY9, CQ2, YT7, YI0, YE0, ZF20, XQ5, XF1, HW2, AG8, CM5, VX6, VC2, VC1, T5, PT9, OY1, HV2 Special Call QSL - W87PAX, Graham VK2FGI - Prefixes C53 (The Gambia), 8SK4 (Sweden) Special Call 8A0IT (International Tourism)

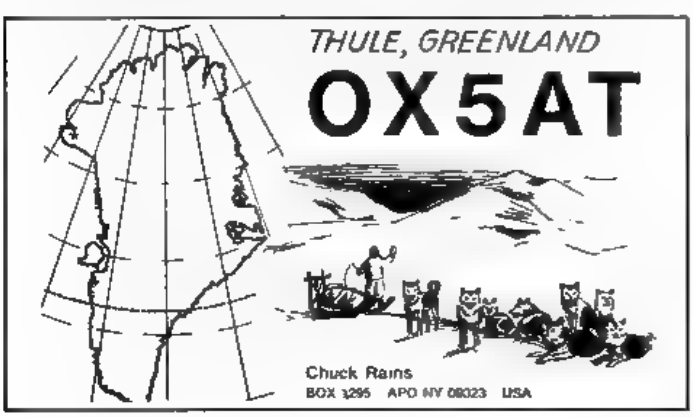
Vic 5AGX. Prefix GB75

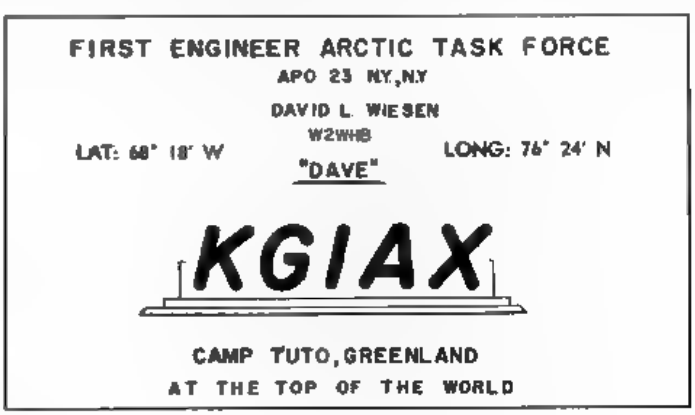
Special Calls . W230G, OK5CSR, 8JIHAM

Current State of the Ladder

Robin	VK6LK	141 points,
Henry	VK3AHQ	91
Chas	VK4UC	58
Jim	VK9NS	57
Eddie	VK8XX	52
Vic	VK5AGX	34
Barry	VK3XV	26
Barry	VK5BS	23
Keith	VK4KS	11
Steve	VK3OT	10

Thanks to all contributors. Keep up the good work If you would like to play a part in building up the WIA QSL collection and to save something for the future, would you please send a half dozen (more if you can spare them) QSL's which you feel would really help the collection along All cards are appreciated, but we especially need commemorative QSL's, special event stations QSL's, special event stations QSL's, specially assigned QSL's (eg VK4RAN), pre-war QSL's, unusual prefixes, rare dx and pictorial QSL's of not so common countries Could you help? Send to PO Box 1, Seville 3139, or phone (059 643 721 for card pick-up or consignment arrangements for larger quantities of cards Thanks. ar





EDUCATION NOTES

BRENDA EDMONDS VK3KT FEDERAL EDUCATION OFFICER
12 PINEWOOD DRIVE MT WAVERLEY 3149

Devolvement Update (continued)

As stated in last month's notes, the devolvement process is moving steadily along.

The WIA is one of a number of bodies which have now received copies of the amended version of the AOCP exam bank and the procedures for having papers accredited

The 'procedures' document contains detailed information on how to seek accreditation, and guidelines for administration of examinations, for preparing papers for the bank, and for producing new questions Samples of the forms to be used to notify DOTC of intended examinations or of examination results, and to inform candidates of their results, are also included, as are sample papers for all sections of the examinations. At present, the sample Regulations paper is based on the current handbook, as the new brochures are not yet complete. It is expected that the Regulations question bank, based on these brochures, will be available in late November

This latest package also contained a list of those to whom devolvement packages have been sent. This I see as being a very useful item. As I have previously stated, I would like to see close co-operation between all those who are actively involved in preparing or administering examinations. I fully expect that the first few exams for any group will show up any problems in the system. If we can share comments and experiences, we may all save ourselves considerable time and effort.

The letter from the DOTC Examinations Officer spelt out the status of the banks with respect to their distribution While it is recognised that the banks will be used as training material in some situations, the letter clearly states "The question banks, the diskettes and the associated documentation are all copyright, and to publish them without permission would be a breach of copyright and would be actionable" The material has been distributed only to those who have expressed an intention to arrange examinations, and it is not intended for them to be any more widely distributed.

A further point made is that at present the banks are only 'first edition' and it is expected that, after a few months use, amendments and additions will extend the range and depth of all banks

I would strongly urge any groups that run classes and, intend to arrange exams for the candidates at the end of the course to give thought now to how the exams are to be organised. For everyone's peace of mind, I recommend the appointment of an 'examinations officer' totally separate from the classes and instructors so that there cannot be any hint of unfair practices

I have previously asked for information about classes and bodies that offer training Once again, I would like to update the listings I currently hold so that we can develop a register of all sources of instruction or aids, such as videotapes, CW tapes or on-air nets. Even if you have previously supplied this information, please send it again. Even if your club or group conducts classes only occasionally, or supplies tapes only to group members, please let me know. Similarly, if you have knowledge of a particularly useful textbook or source of learning materials, I would be pleased to hear of it. And, if there are specific items that you feel the Education Officer or the WIA in general should be able to supply help to candidates or instructors, let me know of those, too. You can send these items to me or to the Executive Office in Caulfield at any time. My best wishes to those sitting for the November exams. Remember, READ THE QUESTION, and ALL the answers. ar

DIVISIONAL NOTES

VK2 Notes

TIM MILLS VK2ZTM

Divisional Broadcasts

IPS Predictions for the next few months indicate that HF coverage from VK2WI is going to be difficult on the existing frequencies A trial transmission is to be made on 30 metres It would also be desirable if more country clubs could set up relays to their local repeater, to assist those with difficult reception on HF Check the Sunday broadcasts for details of the tests

Happenings for November

Wagga ARC field day over the weekend 4/5th - Conference of Clubs, hosted by the CCARC at Gosford Sat 11th - Opening of the 23cm repeater at VK2WI, Dural, Sunday 12th which is being combined with a Microwave field day and demonstration - Trash & Treasure, Sunday afternoon 26th

Divisional News

There has been a slight change to the telephone hours for the Divisional office If you are ringing please note that the new times are noon to 1pm, and outside these times there is a message-taking machine across the line. (02) 6892417 Wednesday night 7 to 9pm as usual . The Division has been able to obtain a small stock of a different model Alinco 2 metre hand-held Details from the office or via the broadcasts. VK2AWI, the station set up at Amateur Radio House, now has antennas installed on 2 and 70cm plus a couple of HF dipoles. Additional antennas are to be installed over the next few months. Some information sheets on VK2 WICEN have been redrafted recently and are available from the Divisional office

Mobile Telephone Use

Last July the NSW Government altered the Motor Traffic Act to make it an offence for the Driver of a Motor vehicle to use a hand-held telephone while the vehicle is in motion While it appears that it was aimed at the users of cellular telephones, the police could extend their interest to the use of any hand-held microphone. The Division has been trying to get a written clarification that it applies only to a 'telephone' Handsfree operation is approved.

Tom, VK1VST has advised that he will be a member of a hiking party during December in the Snowy Mountains back to VK1 About a 10 day operation, with nightly reporting via local repeaters, usually VK1RGI on 9500

Keep in touch with VK2 events and news on the two Sunday broadcasts, see page 3 this

AR for times and frequencies, or telephone news headlines on (02) 6511489 or by packet from VK2RWI 4850 and other systems. Also see the Divisional news sheet 'QST' in your club newsletter. ar

VK3 Notes

JIM LINTON VK3PC

Classes and Exams

The WIA Victorian Division will be conducting classes in 1990 as a service to members and for those who wish to enter the hobby. It will also examine licence candidates in all DOTC required subjects. In February classes for the Novice theory and morse will begin running 26 weeks. An AOCP theory bridging course is scheduled to commence on August 14, 1990. An information sheet fully explaining the classes and special enrolment is now available.

Call Books

Stocks of the 1990 Australian Radio Amateur Call Book have been selling quickly. The price to WIA members is $8.50 or $10 posted. Later this month we expect to receive early copies of both the 1990 International and US Call Books. Copies may be reserved by forwarding a $20 deposit to the Vic Div Book Officer. Members are asked to please note that the Division does not have a credit card facility. All payments forwarded should be by money order or cheque.

New Phone Numbers

The Division's telephone number will change in the near future from 259 9261 to 885 9261. This is a change in prefix only and our fax number will change accordingly to 885 9298. Both the new and old numbers are currently operating.

Instructor Ron Cannon Retires

Well known and popular Morse code instructor for the WIA Victorian Division, Ron Cannon VK3BRC has retired from the position he held for more than 12 years.

His knowledge, patient teaching, friendly encouragement, and practice cassettes have been appreciated by the many who have learnt the code at his classes. The successive WIA Divisional Councils were pleased to have Ron as part of the team conducting the WIA classes at the old headquarters in Brunswick Street Fitzroy, and this year at Camberwell Boys' Grammar School.

Ron was first licensed in 1932 as VK7RC in Wynyard, Tasmania. In 1938 he obtained the Broadcast Operators Certificate of Proficiency, and added to his qualifications with a First Class Commercial Operators Certificate in 1941. He was one of the first radio amateurs given permission to operate crystal controlled on the broadcast band, in those early days when amateurs broadcast music and entertainment to the general public. The old timer occasionally showed his code class students the home-brewed crystal he used around 1280kHz when VK7RC ran broadcasts. It was made from a quartz spectacle bought at the Victoria Market for sixpence or a shilling, when Ron visited Melbourne in 1934 during its centenary celebrations. In a comment on the future of CW, this keen brass pounder says he believes it will continue to be an attraction to further generations because of its uniqueness. Ron has found among his students some who have an affinity with the code, and make it a regular part of their on-air activity. Some of the personal enjoyment from amateur radio for Ron has been meeting his former students on air using CW.

The WIA Victorian Division President has awarded Ron Cannon a Letter of Appreciation for his sterling job of helping so many qualify over the years, and best wishes in his retirement.

Division Library

The reference library is once again open to members. It has taken many months since the move from Fitzroy to Ashburton to re-establish this service. We have technical publications and one of the most complete collections of amateur radio magazines in Australia. A photocopy facility is available for a nominal charge.

Coax Cable and Connectors

As a new service to members, the Division can now supply good quality coax cable, either in low loss foam or Mil Spec RG213, and a range of connectors. These are available to members only at a special price. Plans are continuing for the introduction of other services to members, making membership of the Vic Div even more worthwhile. ar

5/8 Wave

JENNIFER WARRINGTON VK5ANW

The Display of Members' Equipment Night was once again a very successful night and the standard of entries was very high. Trevor Lowe VK5ZTJ won the ICS Award (and an ESC Voucher) for the best piece of equipment over all, with his 2m Digipeater.

Peter Furness VK5FS won the Millar Award for his Radio Controlled Tank Water Level Indicator, for a remote tank on a farm.

ESC Vouchers were won by - Martin Luther VK5GN for his Memory-Keyer and Audio Mixer; Steve Stephenson VK5ZB for his PEP Reading Power Meter; and Clarry Castle VK5KL for his noise-cancelling device for 160m which I gather he has been developing for something like 50 years! Also deserving of an honorable mention was Steve Mahoney VK5AIM with his antenna rotator and controller, which he calls an 'Antenna AIMer' (get it?). I believe that the judges job was not an easy one, and we thank Merv VK5MX and Rob VK5FI for taking it on.

Buy and Sell Night Changes

At our last Buy and Sell, there was a lot on offer, too much in fact! There were three deceased estates, and many members who had to take their gear home unsold, despite the fact that the meeting went on into Wed morning! Council discussed the matter, and has come up with the following ideas. our Oct meeting will be a Buy and Sell of Deceased Estates only, and it will be held on the fourth Tuesday of the month, and not the fifth Tues. In fact, it has been decided to go back to the old system, and cut out meetings on fifth Tuesdays altogether. It's hardly fair to a Speaker who puts a lot of preparation into his talk, if no-one turns up, because they've all decided to leave it until next week, and come to the Buy and Sell night instead.

For those of you who didn't get to sell your gear in Aug, don't despair, there will be a Buy and Sell on Tues Nov 28th for members' gear only - no deceased estates. This should clear up any backlog, and you can then start afresh at our Jan 1990 meeting. But, if the 'other half' is nagging you to get rid of that (dare I say) junk! (pre-loved equipment) before then, don't forget the Adelaide Hills Sale Day at Westbourne Park Memorial Hall, Goodwood Road, Cumberland Park, just south of Big W) on Sat 4th Nov from 10am to 2.00pm. Guaranteed to be far more entertaining than the Grand Prix and the Pageant put together!

Correction to September's Column

In Sept Column I wrote that Brian Austin VK5CA was awarded his Honorary Life Membership for being the Journal Editor for 8 years. His XYL, Marlene VK5QO suggests that it was because Brian was a Council Member for some 25 years - that's a lot of dedication and service by anyone's calculations.

Diary Dates

Don't forget. Tues Nov 28th Buy & Sell for members only (no deceased estates).

Tues Dec 5th. Christmas Social (bring your partner and a Plate of supper). Woodville Community Hall, 64c Woodville Rd Woodville. 8.00pm. ar

Gold Coast Amateur Radio Society Inc

Gold Coast Hamfest '89

The 1990's are almost upon us bringing new standards of technology which affect the way we think and communicate If you're interested in radio, electronics and computers then the 12th annual Gold Coast HAMFEST is a must!

On Saturday the 11th November, the Gold Coast Amateur Radio Society Incorporated in conjunction with a large assortment of exhibitors will present HAMFEST '89 at the Albert Waterways Community Centre in Mermaid Waters

The exhibition will include commercial and hobby displays in radio, electronics and computers - introducing such areas as HAM Radio, satellite television, computer communications over radio, radio teletype, receiving weather satellite pictures, vintage radio displays, computers, amateur television, trade displays and much, much more

There will also be new and second hand equipment and parts for sale Plenty to learn about and plenty of bargains too.

If you're into CB radio and want to get serious about radio communications, then you can find out about, or even enrol in, the next Novice Amateur Radio Operators course. All of this and more is available at HAMFEST '89

There will be door prizes and raffles and almost certainly something for everyone - so bring along the family Refreshments will also be available

Doors will be open between 9am and 5pm Saturday 11th November 1989 at the Albert Waterways Community Centre on the corner of Hooker and Sunshine Boulevards, Mermaid Waters on the Gold Coast (adjacent to Pacific Fair Shopping Centre and not too far from Jupiters Casino).

All of this for an entry fee of just $2 00 - be there!

All Enquiries To

Andrew Chantler VK4TAA

PO Box 6620

Gold Coast Mail Centre

Bundall QLD 4217

Phone B/H (075) 56 2466

A/H (075) 39 6609

The Gosford Field Day

Australia's largest gathering of amateur radio and electronic enthusiasts, will be held at the Gosford Show Ground on Sunday, 18th February, 1990.

More than 1,400 people attended the last Field Day and this year the attendance is expected to be even higher

The tradition of the Gosford Field Day stems back to the early days of radio experimentation and provides a meeting place for enthusiasts and hobbyists to trade ideas and equipment

The first Field Days were organised in the 30's by four amateurs from Wyong, VK2TX Phil Levenspiel, VK2CK Geoff Warner, VK2XP Jeff Thompson, VK2OC Owen Chapman. In 1931, the highlight of the field day was a cricket match held on Wyong Race Course, and in 1932, a hot dinner, at which over 150 sat down, was held in the ground of VK2OC's house at Toowoon Bay. 40 metre fox hunts were a feature of both events.

The coming Field Day has something for everybody with an interest in radio or electronics:

Seminars. Expert speakers will present a number of lectures which will reflect the increasing technological diversity of the hobby

Trade Displays: Featuring the latest offerings of equipment with many of the traders offering special discounts on prices for the latest equipment on the day

Disposals: Offer the possibility to buy that piece of equipment that you have been looking for or an opportunity to sell that surplus piece of equipment. Last Field Day more than 1,600 items were traded.

A Flea Market. For those that have wanted to clean out the garage or shack of all that gear that has accumulated over the years. You can sell from the boot of your car, a trailer, or the tables that are available

Home Brew Contest: With prizes for open and junior constructors.

Equipment of Yesteryear Contest. Bring along your old equipment and display it for others to see and enjoy and be in the running for a prize

Bus Tour to The Ferneries. This is a complimentary bus tour to this unique place just 11 km from Gosford. The Ferneries comprises 50 acres of native rainforest with widening paths through picturesque forests of palms, tree ferns and gums

There is plenty of off-street parking at the Gosford Showground and for those travelling by train, a courtesy bus will pick up and return passengers to Gosford Railway Station. Tea, coffee and biscuits are available from 8.00am to 3.00pm at no charge, and take-away food can be purchased in the Showground

The Gosford Field Day is organised by the Central Coast Amateur Radio Club, and further information can be obtained by writing to, The Field Day Committee

Central Coast Amateur Radio Club Inc

PO Box 252 Gosford NSW 2250

Phone (after hours only): (043) 92 2244

VK4 Disabled Persons' Radio Club News

The Club's 6th Anniversary was celebrated at Roley (VK4AOR - QTHR) and Elaine Norgaard's at "Eden Farm" near Oakey on Father's Day, the 3rd September. Enjoying beautiful VK4 weather, the day was described by club member Ron Bainbridge (VK4BRZ) as the best yet.

Packet AMTOR and RTTY displays and operations were set up by Roley and Ron Smith (VK4AGS), making good contacts Australia-wide and into Noumea. AMTOR mailbox goodwill message, courtesy of VK6YM from Jack and Alma (VK4YC/P8) Richters, camped at Kakadu National Park, was well received

The day was well attended by non-licensed disabled club members, including regulars Paula Batchelor - who enjoyed a first-hand QSO with Heinz (VK3BEW) -, Des Orr, Andrew Stewart and Prue Cornford. They all went out from Toowoomba per parent body HHELP's (Help Handicapped Enter Life Project) handi-bus, driven by volunteer Ray Dougherty

Given that many disabled have speech impediments, keyboard communication was the theme of the day This resulted in members having a chance to communicate on equal terms *for the first time in their lives*. As this also broke down the barrier of a microphone, they thoroughly enjoyed the opportunity

Bill Burge, club patron and father of Tony (VK4BAC), complimented the club on the day's activities, during which there was a minute's silence at 0400 UTC in memory of Tony As well there were the normal formalities giving varying reports and aspects on the club's yearly progress and activities.

Roley expressed his appreciation of the ongoing support and attendance by various other amateurs and members of the Darling Downs Radio Club

Club nets are held every Friday night at 0900 UTC on 3.590 MHz Club call is VK4BTB Station Manager Roley Norgaard (VK4AOR (076) 967587 or Graeme Whitehead (VK4NYE) (076) 308323

DOWN AT MOORABBIN

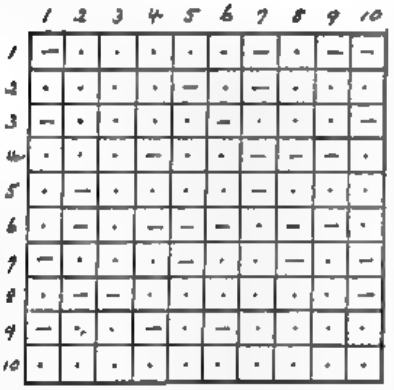
The following were elected at the AGM of the Moorabbin and District Radio Club on 21 July:

President, Steve Cima VK3CIM, Vice-President, Milton Crompton VK3MN, Secretary, Doug Richards VK3CCY; Treasurer, Morrie Lyons VK3BCC; Committee Members, Denis Babore VK3BGS and Hans Linder VK3DNS

QSL Officer, Fred Kolb VK3CFK, Librarian, Alistair Duff VK3KAD; Publicity Officer, Allan Doble VK3AMD; Newsletter Editor, John Hill VK3WZ; Station Officer, Doug Richards VK3CCY; Components Manager, Ray Fowler VK3BHL, and Awards Manager, Fred Kolb VK3CFK. ar

Solution to Morseword No 32

From page 52



Across. 1 thaw, 2 sale, 3 dust, 4 snag, 5 rile; 6 roan; 7 daft; 8 whit; 9 tikes, 10 hies

Down 1 cur; 2 sated, 3 hied, 4 stain, 5 rub; 6 fain, 7 manse; 8 vats; 9 tears; 10 tread.

SILENT KEYS

We regret to announce the recent passing of:

Mr J F Magee	VK1FM
Mr John Clarke	VK2DBZ
Mr Dick Woolfe	VK2DZX
Mr J M Ross	VK4JO
Mr R E Padman	VK5DP
Mr Peter Priestly	VK6IS
Mr P G Wilkinson	VK6YW

John Francis Magee VK1FM

Radio amateurs in Australia and overseas will be saddened to learn that VK1FM, Jack Magee, became a silent key on 2 September 89 while playing golf on his "home" course with his regular companions. He was 71 years of age.

Jack was a late starter in radio, taking his Novice licence in 1978 while inspired by his brother Kevin, YJ8KW, who had been an enthusiast for many years. I first met Jack as his instructor, helping him to grapple with the more advanced radio theory and with improving his morse speed. In those days also, it became my pleasure to "carry" my call-sign to Jack's place on Sunday evenings, so that he could chat with Kevin on 20 meters - Kevin's favourite band. Kevin's motivating influence was strong, and Jack was soon successful in his efforts; in up-grading, he exchanged his Novice call, VK1NBW (No Bad Whisky!) for the two-letter suffix. But he did better than simply succeed. He went on to improve his telegraphy skills, and it was not uncommon to hear him on the bands working CW in the 15-20 wpm speed range, where he soon found that relaxed ability to converse in code without putting pen to paper

As a confirmed "narrow-bander", he later moved to RTTY adding both to his keyboard skills, and to his enjoyment of the hobby.

I think perhaps Jack's greatest single joys in amateur radio were (a) maintaining contacts with his friend Olle, SM0KV, and (b) participating at Government House in the arrangements for the opening ceremony of JOTA. The friendship with Olle began on radio, and blossomed into a wider relationship involving the wives, Shirley and Ulla, and visits to each other's homes at opposite ends of the earth. Both this and the JOTA interest gave Jack a great deal of pleasure over many years. During his working life, Jack had qualified in law, and at amateur radio meetings when controversy sometimes arose, his quiet counsel of moderation was often heard and often heeded

His family, his church, his charitable works, his radio and his golf were the things that Jack valued most in life; he will be sadly missed in all of those areas. On behalf of radio amateurs everywhere, we offer our condolences to his wife Shirley, their three daughters, Patricia, Bernadette and Judith and two sons, Peter and John, who have supported him so strongly in all of his interests.

Don Hume VK1DH

John Clarke VK2DBZ

The death occurred on Wednesday 20 September of John Clarke VK2DBZ of Beresfield, near Maitland.

John, who was 91, had been in hospital in Newcastle for the last three weeks, but prior to this had been active on the air almost daily

John Clarke, first licensed in Australia as VK2DZ, had had a distinguished service and professional life in radio.

Originally a Royal Navy signals operator, he served on two of His Majesty's Ships in the Battle of Jutland in 1916. Both vessels were sunk in this fierce encounter. He became licensed as a radio amateur in 1920

His professional work included the establishing of much of the domestic service of All India Radio, and he was a personal consultant to Mahatma Gandhi, and a friend of the poet and writer Rudyard Kipling. In Australia, he was an official of the Institution of Radio Engineers, and held a management position with Astor Radio in the early days of television. Throughout all, he was an enthusiastic radio amateur and an unforgettable character

We mourn the passing of John Clarke VK2DBZ.

Westlakes Amateur Radio Club

Peter Priestly VK6IS

Peter Priestly VK6IS became a "silent key" on the 1st October, after an illness of several months. Formerly a member of the Royal Navy and Merchant Service, Peter had worked in Perth in the Commonwealth Employment Service for some years.

After his retirement several years ago, Peter was attracted to amateur radio and persevered with his study and exams, obtaining first a novice and later a full call. Despite an all-too-brief career as a ham, Peter was a great enthusiast, and proud of his membership in the Royal Naval Amateur Radio Society in the UK and locally in the WIA.

He will be sadly missed by his friends on forty and two metres. Peter is survived by his wife Angela and daughter Samantha, to whom we extend our deepest sympathy

Lee Hitchins VK6HC ar

OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION AND SHOULD BE LESS THAN 200 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS.

DXpedition Cards

When attending the monthly general meeting, I received from the QSL Bureau Manager the 3W8DX card. This was in reply to my card sent by direct mail, with SAE and "postage" costs. Having been involved with DXpeditions, the "postage" included is always much more than sufficient to cover postage, as I'm aware of expedition costs.

Overheard on 14MHz on 28/7/89 - many VKs were complaining about non-arrival of their 3W8 cards. They, too, had all sent direct QSLs. Perhaps the bureaux have by now also delivered theirs!

Point of all this? Many bureaux do not send or pass over NON-members' cards, but return them to where they came from, be they from bureau or managers. If I had not been a member, I would not have received my 3W8 card, which was sent through the bureau in return for my direct mail QSL.

It's a known fact that DXpeditions cost money. But, is this a fair way to return QSLs? Yes, it's known that the BIG GUNS all received theirs direct, but the little pistols would like the same treatment, please.

Acting as a QSL manager in the past leads me to make this statement, "much more is received from little pistols to cover "postage costs" than is ever received from the BIG GUNS". Any further comments from members of the WIA, or even non members?

NEIL PENFOLD VK6NE
2 MOSS COURT KINGSLEY 6026

Percentage (?) Membership

I query the percentages quoted on club memberships in the article on page 5 of September issue. My understanding is that if in the Westlakes ARC the actual "WIA membership to non-WIA membership is 68%" then it has 68 WIA members to every 100 non-WIA members - percentage already being a ratio. To put it another way, slightly over 40% of its members would belong to the WIA, and I doubt it would be lauding that.

Similarly, in the 80% quoted, the CW Operators QRP Club has 58 WIA members and 72 non WIA members in its 130. Is that what they mean?

Recent comment in our daily press highlighted the fairly common problem. Somebody appealed, "heaven spare me from percentage points!" Unfortunately for them, this is an integral part of the decimal system. A change of temperature from 30 degrees to 20 degrees is a change of 10 degrees or 33.3% (one third of 30), so a change from 30% of something to 20% is a 10 percentage point change, but also a 33.3% change!

I make no apology for my lack of technical expertise because I obtained my AOCP for the sole purpose of working to introduce young people to proper communications, so I rely on the articles in AR for education.

Such errors in use of mathematical terms can be a little confusing.

P V HUGHES VK6HU
58 PRESTON ST
COMO WA 6152

Still More Polarised Plugs

I cannot, for my own peace of mind, overlook the article on page 31 of Sept AR "Polarised Plugs . . . the Simple Way". Modifications to standard 240V three-pin plugs and sockets would be viewed as a very serious offence in a Coroner's Court.

For the author's purpose there are abundant supplies of two-pin polarised plugs and sockets available from electrical suppliers.

The reason for my distress at the suggested modification is the simple fact that in almost all electrical house wiring today the cables can carry and are rated at 27.5 amps, and their protection is usually a slow lag circuit breaker or fuse rated at 30 amps. The incoming supply mains and service fuse are usually rated at 90 amps.

When an inadvertent short circuit occurs whilst a plug is being inserted, then for a few milliseconds, due to the "lag" time, the cable will deliver 90 amps at 240 volts, ie over 20 kilowatts.

Having witnessed this happen, I should describe the result.

The metal around the the plug volatilises, as also does most of the skin and flesh in contact with the plug. If the victims heart fails, cardiac massage must be used whilst the ambulance is called and the patient rushed to hospital. After painful treatment and about five weeks convalescence, the victim may be able to return to light duties.

We do greatly appreciate the many good technical articles submitted to AR, but please put a . . NO . NO . on this one, and I will sleep more peacefully, but still with the memory of a good friend shockingly burned.

LEWIS SMITH VK2LS
30 CUNNING STREET
PORT MACQUARIE 2444

And More!

I refer to the article on page 31 of September AR titled "Polarised Plugs . . . The Simple Way".

I cannot believe that the editor of any technical magazine would be so irresponsible as to allow the publishing of an article which suggests the use of standard three pin plugs for low voltage applications. To print such an article is inexcusable.

The author of the article is foolish in believing that a link between the normal active and neutral pins of the plug will protect him or his equipment from damage when such a plug is connected to the mains. He assumes that his power outlets are correctly wired - there is ample documented evidence relating to fatalities to prove this is not always the case. He also assumes the power circuit is protected by a fuse of the correct rating - does he believe in Santa Claus?

I have been employed in the electrical trade since 1963, am a licensed electrician and a licensed electrical contractor. For the past 16 years I have been employed by an electricity supply authority and during that time have found incorrectly wired power outlets and fuses so heavily wired that faults have taken the 100 Amp council service fuse.

I know I am suitably qualified to criticise this article!

Since 1974 I have been the NSW Central Coast Region WICEN Co-ordinator and would be appalled if a member of my team started using three pin plugs on his low voltage equipment.

Although I don't advocate their use (because two wiring "standards"" are in use), polarised low voltage plus are available from any reputable electrical wholesaler. These plugs are manufactured for use on equipment operating at or below 32 Volts and cost a little more than the normal three pin variety. Their pin configuration is in the form of a "T" so that they cannot be inserted into a three pin outlet.

Although the damage is now done, I am sure that you will feel compelled to publish a

prominent warning on the dangers of using three pin mains plugs on low voltage equipment.

RA WELLS VK2TV
PO BOX 66
TOUKLEY 2263

(We plead guilty to thoughtlessness, but not irresponsibility. Letters published in response have made very clear to all the dangers of the suggested application. Many who had never seriously thought about some of the more obscure safety implications are now well aware of them. They would still be ignorant had we not published the item. Ed.)

The Last of Those Plugs . . .

I wish to protest about the publication of the article entitled Polarised Plugs . . . The Simple Way which appeared on page 31 of the September 1989 issue of Amateur Radio. In my opinion it should have been titled Polarised Plugs . . . The Deadly Way

The Federal Tape on the regular WIA broadcasts brought the hazards of this article to our attention, but by this time it was too late! The Amateur Radio technical editors should NEVER have allowed this article to be published!

The mere thought of using a MAINS plug for low-voltage use is inviting disaster - indeed, it is sheer STUPIDITY! Even if a warning is written on the outside of the pluge, it does not prevent young children or even adults from inadvertently plugging it into the mains power outlet.

What if the fuse or circuit breaker were too slow to react? It is possible that the 12 volt equipment on the other end would be destroyed or even worse, and electrical shock - perhaps fatal - could result to whoever plugged it in!

I ask that the author please use mains plugs and sockets for their intended purpose and stick to low voltage connectors for low voltage work and would advise other amateurs AGAINST the methods described in the article

So what if the low voltage connectors are dearer (and I dispute this in any case) - what price can you place on a life?

STEVEN PULLAN VK2KXX
17 CLARINDA STREET
HORNSBY 2077

PS I hope the author has a copy of the emergency heart-lung resuscitation chart prominently displayed in his shack!

(The Technical Editors are without blame, Steve. Due to a procedural malfunction, they were not given the opportunity to consider the article. The points you make have now had adequate exposure, and the time has come to call a halt to this correspondence. Ed.)

Beacons on Six

I feel I must draw your attention to something brought up by Eric VK5LP in his column in September AR, page 40. It would appear from his comments that Eric is actively canvassing the idea of placing beacons in the new 6m segment. Unfortunately, that is something we need like a hole in the head.

The following points apply re Eric's suggestions.

1) One purpose in expanding the SSB section from 50.150 to 50.200 MHz was to provide much needed additional operating space.

2) Since the release of the new segment there has been a vast increase in 6m activity, making the expanded segment essential, not a luxury.

3) In an area such as Melbourne, where there may well be 50 stations active during a band opening, the situation can be chaotic. In a 50kHz segment with geographically closely spaced stations, it is impossible to fit more than a handful of stations in. You simply can't work weak DX with another station less than 5kHz away, even under the best of conditions. If a local station is running full power, and the signal is even slightly broad, you have probably lost the best part of 20kHz to that one station alone - more with a bad signal. We need every bit of the segment for SSB use.

4) The idea of having beacons in the 50.100-50.200 MHz segment has horrified all those who have spoken to me about it. Even ONE local beacon would mean a loss of at least 20 kHz out of the additional 50 kHz we have gained. You couldn't expect to work any DX within at least 10 kHz above and below a local, well sited beacon. Where powerline noise is a problem and noise blankers are a must, the presence of a constant beacon signal could mean constant cross modulation. Further, DX stations will have reduced operating space with VK beacons filling the band, making it harder to hear other VKs from all areas. 50.100-50.200 MHz is a PRIME DX area in places such as JA or W, and any beacon in that segment would be an ENTIRELY INAPPROPRIATE use

5) If the eastern states had been given the same spectrum as VK5, 6, 8, 9 and 0, the matter would be completely different, and no-one would object to a SUITABLE beacon subband. But the very limited spectrum available in VK1, 2, 3, 4 and 7 makes such a plan impractical below 52.0 MHz. Remember also, these call areas contain the bulk of the Australian Amateur population.

6) Now, more than ever, we must observe our international obligations. Before attempting to run beacons on any frequency, the effect on other users of the band must be considered. For example, a beacon in VK4, VK6 or VK8 may well be copied in JA etc for very lengthy periods. On a poorly chosen frequency it could well have little more than nuisance value. A good example is the beacon just above 28.885 MHz (6m liaison frequency) which QRMs this frequency constantly

7) If beacons are installed in the section below 50 100 MHz, CW users of the band must also be given consideration, as there is only 50 kHz for purely CW operation (50 050-50.100 MHz). If a beacon were placed in each call area in this segment it would effectively ruin CW operation in VK, as every state would have at least 20 kHz destroyed by its local beacon, plus QRM from beacons on Es.

8) At the present time there are beacons in Darwin on 50.056 MHz, Perth on 50.066 MHz, Toowoomba TV on 51 670 MHz, Wagga TV on 51 740 MHz, plus all the existing 52 MHz beacons. What real need is there for other beacons? Any serious DX station will listen first for the TV audio as we listen for the BY/UA video. I am usually working JAs before JA beacons are at a useful level

9) Even now, after DECADES of band plans, we still haven't been able to confine the existing beacons on 52 MHz to the correct subbands, eg Darwin on 52 200 MHz (should be on 52 480 MHz) and Wickham on 52.320 MHz (should be on 52 360 or 52.365 MHz etc).

10) If the states with full access to 50-54 MHz want to put beacons below 52.0 MHz in a reasonable area, which won't QRM local or DX stations, I can see no reason why they shouldn't do so. To ruin 50 050-50 200 MHz at this time would, in the opinion of myself and many others, be both selfish and unthinkable. We simply have too much to lose, and very little, if anything, to gain

11) The new regulations relating to operation in the eastern states on 50 050-50 200 MHz SPECIFICALLY prohibit use of modes other than CW or SSB, which would rule out FSK for beacon use

12) The international CW section of 6m (50.010-50.100 MHz) has virtually been transformed into a de facto beacon segment (check September AR, page 39). It will be noticed, however, that only ONE beacon is listed worldwide between 50 110 and 50 200 MHz.

I recall many years ago that Eric was very vocal when it was proposed that the VK5 6m beacon be moved from 53 000 MHz to the 52.300-52 500 MHz segment adversely affecting operation around Adelaide on 52 050 MHz. That proposal was minor compared with the present suggestion. I consider that if beacons are promoted in the 50 100-50 200 MHz segment it could well wreck all the good that has been done by the WIA, VK1RX and DOTC to improve the availability of 50 MHz. If that were to happen it would be an absolute tragedy

GEOFF WILSON VK3AMK
7 NORMAN AVENUE
FRANKSTON 3199

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With the IC3210A, there are 20 double-spaced memory channels for 2 metres and 70 cm.

What's more, the IC3210A offers full duplex facility. Which means you can now simultaneously transmit on one band and receive on the other. You never have to wait for a long "over". You have full "break in". In fact, you can talk as easily as talking over the phone.

Call (008) 338 915 for your nearest Icom stockist today. (The telephone conversation in itself is a very good example of IC3210A's duplex facility.)

With all these functions in one small compact mobile, it really is a wonder they're still so compact and mobile.

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